

PATENT COOPERATION TREATY



From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
MKG LLC
306 INDUSTRIAL PARK ROAD
SUITE 206
MIDDLETOWN, CT 06457
USA

PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing
(day/month/year)

21 APR 2016

Applicant's or agent's file reference

1230-0061WO

IMPORTANT NOTIFICATION

International application No.

PCT/US15/28484

International filing date (day/month/year)

30 April 2015 (30.04.2015)

Priority date (day/month/year)

01 May 2014 (01.05.2014)

Applicant

CYTEC INDUSTRIES INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/ US

Mail Stop PCT, Attn: IPEA/US
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Alexandria, Virginia 22313-1450

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Authorized officer

/JOSEPH D. ANTHONY/

Telephone No. (571) 272-1700

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 1230-0061WO	FOR FURTHER ACTION		See Form PCT/IPEA/416																								
International application No. PCT/US15/28484	International filing date (<i>day/month/year</i>) 30 April 2015 (30.04.2015)	Priority date (<i>day/month/year</i>) 01 May 2014 (01.05.2014)																									
International Patent Classification (IPC) or national classification and IPC IPC: Please See Continuation Sheet USPC:																											
Applicant CYTEC INDUSTRIES INC.																											
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>9</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (<i>sent to the applicant and to the International Bureau</i>) a total of <u>52</u> sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No.I and the Supplemental Box (see Rule 70.16(b)). b. ☐ (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____ containing a sequence listing, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3bis of Annex C of the Administrative Instructions).																											
4. This report contains indications relating to the following items: <table style="width: 100%; border: none;"> <tr> <td style="width: 10%; text-align: center;">☒</td> <td style="width: 20%;">Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;">☒</td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;">☐</td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;">☒</td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>				☒	Box No. I	Basis of the report	☐	Box No. II	Priority	☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	☐	Box No. IV	Lack of unity of invention	☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement	☐	Box No. VI	Certain documents cited	☐	Box No. VII	Certain defects in the international application	☒	Box No. VIII	Certain observations on the international application
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Date of submission of the demand 01 March 2016 (01.03.2016)		Date of completion of this report 30 March 2016 (30.03.2016)																									
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer JOSEPH D. ANTHONY Telephone No. (571) 272-1700																									

Box No. I Basis of the report1. With regard to the **language**, this report is based on:

- ☒ the international application in the language in which it was filed.
- ☐ a translation of the international application into English which is the language of a translation furnished for the purposes of:
- ☐ international search (Rules 12.3(a) and 23.1(b)).
- ☐ publication of the international application (Rule 12.4(a)).
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a) and (b)).

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:
 pages 1-50 as originally filed/furnished
 pages* NONE received by this Authority on _____
 pages* NONE received by this Authority on _____
- ☒ the claims:
 pages NONE as originally filed/furnished
 pages* NONE as amended (together with any statement) under Article 19
 pages* 51-72/1 received by this Authority on 01 March 2016 (01.03.2016)

- ☒ the drawings:
 pages 1/2-2/2 as originally filed/furnished
 pages* NONE received by this Authority on _____
 pages* NONE received by this Authority on _____

- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages none
- ☒ the claims, Nos. 1-36
- ☒ the drawings, sheets/figs none
- ☒ the sequence listing (*specify*): none

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____

5. ☐ This report has been established:

- ☐ taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
- ☐ without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.4bis) and 70.2(e)).

6. ☒ With regard to top-up searches (Rules 66.1ter and 70.2(f)):

- ☒ A top-up search was carried out by this Authority on 29 March 2016 (29.03.2016)
- ☒ Additional relevant documents have been discovered during the top-up search.
- ☐ No top-up search was carried out by this Authority because it would serve no useful purpose.

7. ☐ Supplementary international search report(s) from Authority(ies) _____ has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US15/28484**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims <u>38, 52-53, 55, 61-63 and 68-69</u>	YES
	Claims <u>37, 39-51, 54, 56-60, 64-67 and 70-74</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>37-74</u>	NO
Industrial Applicability (IA)	Claims <u>37-74</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and Explanations (Rule 70.7)
Please See Continuation Sheet

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US15/28484

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 63 is objected to under PCT Article 6 as lacking clarity because the claim is indefinite for the following reason(s): claim 63 is dependent on claims 62-63. A claim cannot be dependent on itself (i.e. claim 63 on claim 63).

Supplemental Box Relating to Sequence Listing

Continuation of Box No. I, item 2:

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this report was established on the basis of a sequence listing filed or furnished:

a. (means)

☐

on paper

☐

in electronic form

b. (time)

☐

in the international application as filed

☐

together with the international application in electronic form

☐

subsequently to this Authority for the purposes of search and/or examination

☐

to this Authority as an amendment* on _____

2. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

* If item 4 in Box No. I applies, the sequence listing, which forms part of the basis of the report, may be marked "superseded."

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:

Continuation of IPC:

C08K 3/00(2006.01);C08K 3/22(2006.01);C08K 3/26(2006.01);C08K 5/13(2006.01);C08K 5/132(2006.01);C08K 5/134(2006.01);C08K 5/20(2006.01);C08K 5/3435(2006.01);C08K 5/3462(2006.01);C08K 5/3492(2006.01);C08K 5/375(2006.01);C08K 5/524(2006.01);C08K 13/02(2006.01);C09K 15/02(2006.01);C09K 15/08(2006.01);C09K 15/30(2006.01);C09K 15/32(2006.01)

V. 2. Citations and Explanations:

Please See Continuation Sheet

Claims 37, 39-51, 54, 56-60, 64-67 and 70-74 lack novelty under PCT Article 33(2) as being anticipated by Stretanski et al. U.S. Patent Number 6,843,939.

Stretanski et al. teach an UV stabilizing additive composition comprising an ortho-hydroxy triazine compound, a hindered hydroxybenzoate compound and optionally a hindered amine compound. This additive composition may be used to stabilize materials from UV radiation. This invention also contemplates a method of stabilizing a material by contacting the material with the UV stabilizing additive composition, see abstract.

Applicant's claims are deemed to be anticipated over Stretanski et al.'s Examples 3 and 8 as set forth in Tables 1-6. Examples 3 and 8 teach compositions comprising: a polypropylene polymer, an ortho-hydroxyl tris-aryl-s-triazine compound (Cyasorb UV 1164); a hindered amine light stabilizer compound (Cyasorb UV 3529); a hindered hydroxybenzoate compound (Cyasorb UV 2908); an acid scavenger (calcium stearate); a phosphite compound (Doverphos 9228); and a hindered phenol antioxidant compound (Cyanox 1741).

Claim 61 lacks an Inventive Step under PCT Article 33(3) as being obvious over Stretanski et al. U.S. Patent Number 6,843,939.

Stretanski et al. has been described above and differs from applicant's claimed invention in that there is not a direct teaching (i.e. by way of an example) to where the: "*composition is a master batch and the thermal and UV light stabilizing composition is present in an amount from about 10 wt. % to about 80 wt. % based on a total weight of the master batch composition, and the material to be stabilized is present in an amount from about 20 wt. % to about 90 wt. % based on the total weight of the master batch composition.*".

It would have been obvious to one having ordinary skill in the art to use Stretanski et al.'s direct disclosure of column 7, lines 18-59 as strong motivation to actually make a composition wherein the concentration of the thermal and UV light stabilizing composition

Supplemental Box

falls within applicant's claimed concentration range, and the concentration of the material to be stabilized (e.g. a polymer) also falls within applicant's claimed composition range.

Claims 38, 52-53, 55, 62-63 and 68-69 lack an Inventive Step under PCT Article 33(3) as being obvious over Stretanski et al. U.S. Patent Number 6,843,939 in view of anyone of the following: Ishii et al. U.S. Patent Number 5,214,084 or Samuels U.S. Patent Number 6,051,164.

Stretanski et al. has been described above and differs from applicant's claimed invention in that there is no direct disclosure to the further addition of a thioester compound to improve stability against heat, oxidation and/or UV light. Nevertheless, Stretanski et al. does disclose that additional stabilizers as well as other components can be optionally incorporated into a polymer, see column 7, lines 42-53.

Ishii et al. teach A polypropylene resin containing an .alpha.-olefinic copolymer rubber and an inorganic filler is stabilized by incorporating therein the following 6 components: (A) a hindered phenolic compound having a molecular weight of not less than 500, (B) a high-molecular hindered piperidine compound such as poly[{6-(1,1,3,3-tetramethylbutyl)amino-1,3,5-triazine-2,4-diyl}{(2,2,6,6-tetramethyl-4-piperidyl)-imino}hexamethylene{(2,2,6,6-tetramethyl-4-piperidyl)imino}], (C) a low-molecular hindered piperidine compound such as 2-methyl-2-(2,2,6,6-tetramethyl-4-piperidyl)amino-N-(2,2,6,6-tetramethyl-4-piperidyl)propionamide, (D) a benzoate compound such as 2,4-di-t-butylphenyl 3,5-di-t-butyl-4-hydroxybenzoate, (E) a phosphorous compound such as bis(2,4-di-t-butylphenyl) pentaerythritol diphosphite, and (F) an amide compound such as ethylene-bisstearylamine. **This composition may also contain a sulfur compound such as dialkyl thiodipropionate and pentaerythritol tetrakis(3-alkylthiopropionate).** The composition disclosed is stable not only against heat and oxidation but also against light, see abstract. Also see column 7, lines 7-38 wherein it is disclosed that small amounts of an alkyl sulfur compounds have been shown to improve the performance of stabilizer compositions that include hindered amine type light stabilizers as one of the compounds. Ishii et al. is also deemed to disclose all of applicant's claimed stabilizer components with the exception of an ortho-hydroxyl tris-aryl-s-triazine compound, see columns 5-7.

Samuels teaches a polymeric article, such as an extruded or molded article or a biaxially oriented tape or film, and a method of stabilizing such a polymeric article to protect the article from degradation due to exposure to UV light. The article is formed by blending a polymeric material with from about 50 to about 5,000 ppm of at least one ortho hydroxy tris-aryl triazine light absorber and from about 500 ppm to about 1.25 percent of at least one oligomeric, polymeric, or high molecular weight HALS having a molecular weight of at least about 500, wherein the weight ratio of HALS to triazine light absorber is from about 3:1 to about 20:1, to form a stabilized polymeric composition, and forming an extruded or molded article or a biaxially oriented tape or film from the stabilized polymeric composition, see abstract. **Samuels further discloses the optional addition of esters of thiodipropionic acid such as dilauryl thiopropionate and/or distearyl thiodipropionate as heat, oxidation and UV light stabilizers for polymers, see column 10, lines 32-57.** Samuels also discloses that the UV light stabilizing compositions can be made in the form of a concentrate (reads on applicant's master-batch composition), see column 10, lines 4-10.

It would have been obvious to one having ordinary skill in the art to use the individual disclosures of either secondary reference to Ishii et al. or Samuels, as strong motivation to actually add a small amount of a thioester compound as an additional heat, oxidation and UV light stabilizer compound to the polymers being stabilized by the stabilizer combination taught by the primary reference to Stretanski et al.. The courts have consistently declared that to employ two or more materials in combination for the same purpose they are taught as being individually useful is not patentable outside a showing of superior and unexpected results. Likewise, it would also have been obvious to one having ordinary skill in the art to use Samuels's disclosure of making stabilizing compositions in the form of concentrates as motivation to make Stretanski et al.'s stabilizing compositions in the form of concentrates that read on applicant's claimed master-batch compositions of claims 62-63.

Claims 37-74 are deemed to meet the requirement of PCT Article 33(4) as having Industrial Applicability because the stabilizing composition is deemed to be an effective stabilizer when added to a polymer.

----- NEW CITATIONS -----

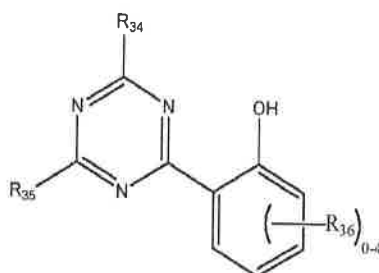
US 6,843,939 A (STRETANSKI et al.) 18 January 2005, see abstract and Examples 3 and 8 in Tables 1-6.

US 6,051,164 A (SAMUELS) 18 April 2000, see abstract and column 10, lines 4-57.

What is claimed is:

37. A thermal and ultraviolet (UV) light stabilizer composition comprising:
- an ortho-hydroxyl tris-aryl-s-triazine compound;
 - a hindered amine light stabilizer compound;
 - a hindered hydroxybenzoate compound;
 - an acid scavenger;
 - a phosphite compound; and
 - a hindered phenol antioxidant compound.
38. The thermal and UV light stabilizer composition according to claim 37, further comprising a thioester compound.

39. The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the ortho-hydroxyl tris-aryl-s-triazine compound is a 2-(2'-hydroxyphenyl)-1,3,5-triazine compound according to Formula (I):

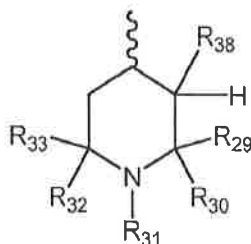


Formula (I)

wherein each of R_{34} and R_{35} in Formula (I) is independently chosen from C_6 - C_{10} aryl optionally substituted, C_1 - C_{10} hydrocarbyl-substituted amino, C_1 - C_{10} acyl and C_1 - C_{10} alkoxy; and wherein R_{36} in Formula (I) is a substituent that is the same or different at from 0 to 4 positions of the phenoxy portion of Formula I and is independently chosen from hydroxyl, C_1 - C_{12} hydrocarbyl, C_1 - C_{12} alkoxy, C_1 - C_{12} alkoxyester, and C_1 - C_{12} acyl.

40. The thermal and UV light stabilizer composition according to claim 39, wherein the 2-(2'-hydroxyphenyl)-1,3,5-triazine compound is chosen from: 4,6-bis-(2,4-dimethylphenyl)-2-(2-hydroxy-4-octyloxyphenyl)-s-triazine; 4,6-bis-(2,4-dimethylphenyl)-2-(2,4-- dihydroxyphenyl)-s-triazine; 2,4-bis(2,4-dihydroxyphenyl)-6-(4-chlorophenyl)-s-triazine; 2,4-bis[2-hydroxy-4-(2-hydroxy-ethoxy)phenyl]-6-(4-chlorophenyl)-s-triazine; 2,4-bis[2-hydroxy-4-(2-hydroxy-ethoxy)phenyl]-6-(2,4-dimethylphenyl)-s-triazine; 2,4-bis[2-hydroxy-4-(2-hydroxyethoxy)phenyl]-6-(4-bromophenyl)-s-triazine; 2,4-bis[2-hydroxy-4-(2-acetoxyethoxy)phenyl]-6-(4-chlorophenyl)-s-triazine; 2,4-bis(2,4-dihydroxyphenyl)-6-(2,4-dimethylphenyl)-s-triazine; 2,4-bis(4-biphenyl)-6-[2-hydroxy-4-[(octyloxycarbonyl)ethylideneoxy]phenyl]-s-triazine; 2,4-bis(4-biphenyl)-6-[2-hydroxy-4-(2-ethylhexyloxy)phenyl]-s-triazine; 2-phenyl-4-[2-hydroxy-4-(3-sec-butyloxy-2-hydroxypropyloxy)phenyl]-6-[2-hydroxy-4-(3-sec-amyloxy-2-hydroxypropyloxy)phenyl]-s-triazine; 2,4-bis(2,4-dimethylphenyl)-6-[2-hydroxy-4-(3-benzyloxy-2-hydroxypropyloxy)phenyl]-s-triazine; 2,4-bis(2-hydroxy-4-n-butyloxyphenyl)-6-(2,4-di-n-butyloxyphenyl)-s-triazine; 2,4-bis(2,4-dimethylphenyl)-6-[2-hydroxy-4-(3-nonyloxy-2-hydroxypropyloxy)-5- α -cumylphenyl]-s-triazine; methylenebis-{2,4-bis(2,4-dimethylphenyl)-6-[2-hydroxy-4-(3-butyloxy-2-hydroxypropoxy)phenyl]-s-triazine}; methylene bridged dimer mixture bridged in the 3:5', 5:5' and 3:3' positions in a 5:4:1 ratio; 2,4,6-tris(2-hydroxy-4-isooctyloxycarbonyliso-propylideneoxy-phenyl)-s-triazine; 2,4-bis(2,4-dimethylphenyl)-6-(2-hydroxy-4-hexyloxy-5- α -cumylphenyl)-s-triazine; 2-(2,4,6-trimethylphenyl)-4,6-bis[2-hydroxy-4-(3-butyloxy-2-hydroxypropyloxy)phenyl]-s-triazine; 2,4,6-tris[2-hydroxy-4-(3-sec-butyloxy-2-hydroxypropyloxy)-phenyl]-s-triazine; mixture of 4,6-bis-(2,4-dimethylphenyl)-2-(2-hydroxy-4-(3-dodecyloxy-2-hydroxypropoxy)phenyl)-s-triazine and 4,6-bis-(2,4-dimethylphenyl)-2-(2-hydroxy-4-(3-tridecyloxy-2-hydroxypropoxy)phenyl)-s-triazine; 4,6-bis-(2,4-dimethylphenyl)-2-(2-hydroxy-4(3-(2-ethylhexyloxy)-2-hydroxypropoxy)-phenyl)-s-triazine; 4,6-diphenyl-2-(4-hexyloxy-2-hydroxyphenyl)-s-triazine; 2-(4,6-Diphenyl-1,3,5-triazin-2-yl)-5-[2-(2-ethylhexanoyloxy)ethoxy]phenol; 2,4,6-tris(2-hydroxy-4-octyloxyphenyl)-1,3,5-triazine; propanoic acid, 2,2',2''-[1,3,5-triazine-2,4,6-triyltris[(3-hydroxy-4, 1-phenylene)oxy]]tris-1,1',1''-triethyl ester; propanoic acid, 2-[4-[4,6-bis([1,1'-biphenyl]-4-yl)-1,3,5-triazin-2-yl]-3-hydroxyphenoxyl]-isooctyl ester; and combinations thereof.

41. The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered amine light stabilizer compound comprises a molecular fragment according to Formula (II):



Formula (II)

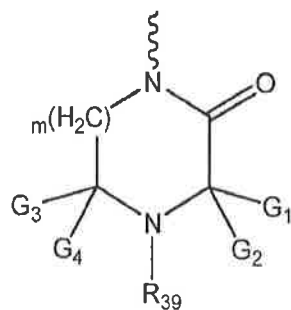
wherein

R_{31} in Formula (II) is chosen from: hydrogen; OH; C_1 - C_{20} hydrocarbyl; $-CH_2CN$; C_1 - C_{12} acyl; and C_1 - C_{18} alkoxy;

R_{38} in Formula (II) is chosen from: hydrogen; and C_1 - C_8 hydrocarbyl; and

each of R_{29} , R_{30} , R_{32} , and R_{33} in Formula (II) is independently chosen from C_1 - C_{20} hydrocarbyl, or R_{29} and R_{30} and/or R_{32} and R_{33} in Formula (II) taken together with the carbon to which they are attached form a C_5 - C_{10} cycloalkyl;

or Formula (IIa)



Formula (IIa)

wherein

m in Formula (IIa) is an integer from 1 to 2; R₃₉ in Formula (IIa) is chosen from: hydrogen; OH; C₁-C₂₀ hydrocarbyl; -CH₂CN; C₁-C₁₂ acyl; and C₁-C₁₈ alkoxy; and each of G₁-G₄ in Formula (IIa) is independently chosen from C₁-C₂₀ hydrocarbyl.

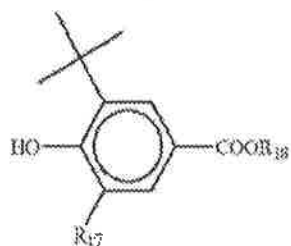
42. The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered amine light stabilizer is chosen from: bis(2,2,6,6-tetramethylpiperidin-4-yl) sebacate; bis(2,2,6,6-tetramethylpiperidin-4-yl)succinate; bis(1,2,2,6,6-pentamethylpiperidin-4-yl)sebacate; bis(1-octyloxy-2,2,6,6-tetramethylpiperidin-4-yl)sebacate; bis(1,2,2,6,6-pentamethylpiperidin-4-yl) n-butyl 3,5-di-tert-butyl-4-hydroxybenzylmalonate; a condensate of 1-(2-hydroxyethyl)-2,2,6,6-tetramethyl-4-hydroxypiperidine and succinic acid; 2,2,6,6-tetramethylpiperidin-4-yl stearate; 2,2,6,6-tetramethylpiperidin-4-yl dodecanate; 1,2,2,6,6-pentamethylpiperidin-4-yl stearate; 1,2,2,6,6-pentamethylpiperidin-4-yl dodecanate; a condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-tert-octylamino-2,6-dichloro-1,3,5-triazine; tris(2,2,6,6-tetramethylpiperidin-4-yl) nitrilotriacetate; tetrakis(2,2,6,6-tetramethylpiperidin-4-yl)-1,2,3,4-butanetetracarboxylate; 4-benzoyl-2,2,6,6-tetramethylpiperidine; 4-stearyloxy-2,2,6,6-tetramethylpiperidine; bis(1,2,2,6,6-pentamethylpiperidyl)-2-n-butyl-2-(2-hydroxy-3,5-di-tert-butylbenzyl)malonate; 3-n-octyl-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decan-2,4-dione; bis(1-octyloxy-2,2,6,6-tetramethylpiperidyl)sebacate; bis(1-octyloxy-2,2,6,6-tetramethylpiperidyl)succinate; a condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-morpholino-2,6-dichloro-1,3,5-triazine; a condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-morpholino-2,6-dichloro-1,3,5-triazine, methylated; a condensate of 2-chloro-4,6-bis(4-n-butylamino-2,2,6,6-tetramethylpiperidyl)-1,3,5-triazine and 1,2-bis(3-aminopropylamino)ethane; a condensate of 2-chloro-4,6-bis(4-n-butylamino-1,2,2,6,6-pentamethylpiperidyl)-1,3,5-triazine and 1,2-bis(3-aminopropylamino)ethane; 8-acetyl-3-dodecyl-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decan-2,4-dione; 3-dodecyl-1-(2,2,6,6-tetramethylpiperidin-4-yl)pyrrolidin-2,5-dione; 3-dodecyl-1-(1-ethanoyl-2,2,6,6-tetramethylpiperidin-4-yl)pyrrolidin-2,5-dione; 3-dodecyl-1-(1,2,2,6,6-pentamethylpiperidin-4-yl)pyrrolidine-2,5-dione; a mixture of 4-hexadecyloxy- and 4-stearyloxy-2,2,6,6-tetramethylpiperidine; a condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-cyclohexylamino-2,6-dichloro-1,3,5-triazine; a condensate of 1,2-bis(3-aminopropylamino)ethane, 2,4,6-trichloro-1,3,5-triazine and 4-butylamino-2,2,6,6-tetramethylpiperidine; 2-undecyl-7,7,9,9-tetramethyl-1-oxa-3,8-diaza-4-oxospiro[4.5]decane;

oxo-piperanzinyl-triazines; a reaction product of 7,7,9,9-tetramethyl-2-cycloundecyl-1-oxa-3,8-diaza-4-oxospiro[4.5]decane and epichlorohydrin; tetrakis(2,2,6,6-tetramethyl-4-piperidyl)butane-1,2,3,4-tetracarboxylate; 1,2,3,4-butanetetracarboxylic acid, tetrakis(1,2,2,6,6-pentamethyl-4-piperidinyl)ester; 1,2,3,4-butanetetracarboxylic acid, 1,2,2,6,6-pentamethyl-4-piperidinyl tridecyl ester; 1,2,3,4-butanetetracarboxylic acid, 2,2,6,6-tetramethyl-4-piperidinyl tridecyl ester; 1,2,3,4-butanetetracarboxylic acid, polymer with 2,2,6,6-tetramethyl-2,4,8,10-tetraoxaspiro[5.5]undecane-3,9-diethanol, 1,2,2,6,6-pentamethyl-4-piperidinyl ester; 1,2,3,4-butanetetracarboxylic acid, polymer with 2,2,6,6-tetramethyl-2,4,8,10-tetraoxaspiro[5.5]undecane-3,9-diethanol, 2,2,6,6-tetramethyl-4-piperidinyl ester; bis(1-undecanoxo-2,2,6,6-tetramethylpiperidin-4-yl)carbonate; 1-(2-hydroxy-2-methylpropoxy)-2,2,6,6-tetramethyl-4-piperidinol; 1-(2-hydroxy-2-methylpropoxy)-4-octadecanoyloxy-2,2,6,6-tetramethylpiperidine; 1-(4-octadecanoyloxy-2,2,6,6-tetramethylpiperidin-1-yloxy)-2-octadecanoyloxy-2-methylpropane; 1-(2-hydroxyethyl)-2,2,6,6-tetramethyl-4-piperidinol; a reaction product of 1-(2-hydroxyethyl)-2,2,6,6-tetramethyl-4-piperidinol and dimethylsuccinate; 2,2,4,4-tetramethyl-7-oxa-3,20-diazadispiro[5.1.11.2]heneicosan-21-one; the ester of 2,2,6,6-tetramethyl-4-piperidinol with higher fatty acids; 3-dodecyl-1-(2,2,6,6-tetramethyl-4-piperidyl)pyrrolidine-2,5-dione; 1H-Pyrrole-2,5-dione, 1-octadecyl-, polymer with (1-methylethenyl)benzene and 1-(2,2,6,6-tetramethyl-4-piperidinyl)-1H-pyrrole-2,5-dione; piperazinone, 1,1',1''-[1,3,5-triazine-2,4,6-triyltris[(cyclohexylimino)-2,1-ethanediyl]]tris[3,3,5,5-tetramethyl-; piperazinone, 1,1',1''-[1,3,5-triazine-2,4,6-triyltris[(cyclohexylimino)-2,1-ethanediyl]]tris[3,3,4,5,5-pentamethyl-; the reaction product of 7,7,9,9-tetramethyl-2-cycloundecyl-1-oxa-3,8-diaza-4-oxospiro[4.5]decane and epichlorohydrin; the condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-cyclohexylamino-2,6-dichloro-1,3,5-triazine; the condensate of 1,2-bis(3-aminopropylamino)ethane, 2,4,6-trichloro-1,3,5-triazine and 4-butylamino-2,2,6,6-tetramethylpiperidine; the condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-morpholino-2,6-dichloro-1,3,5-triazine; the condensate of 2-chloro-4,6-bis(4-n-butylamino-2,2,6,6-tetramethylpiperidyl)-1,3,5-triazine and 1,2-bis(3-aminopropylamino)ethane; the condensate of 2-chloro-4,6-bis(4-n-butylamino-1,2,2,6,6-pentamethylpiperidyl)-1,3,5-triazine and 1,2-bis-(3-aminopropylamino)ethane; 2-[(2-hydroxyethyl)amino]-4,6-bis[N-(1-cyclohexyloxy-2,2,6,6-tetramethylpiperidin-4-yl)butylamino]-1,3,5-triazine; propanedioic acid, [(4-methoxyphenyl)-methylene]-bis-(1,2,2,6,6-pentamethyl-4-

piperidinyl) ester; tetrakis(2,2,6,6-tetramethylpiperidin-4-yl)-1,2,3,4-butanetetracarboxylate; benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, 1-[2-[3-[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]-1-oxopropoxy]ethyl]-2,2,6,6-tetramethyl-4-piperidinyl ester; N-(1-octyloxy-2,2,6,6-tetramethylpiperidin-4-yl)-N'-dodecyloxalamide; tris(2,2,6,6-tetramethylpiperidin-4-yl) nitrilotriacetate; 1,5-dioxaspiro{5,5}undecane-3,3-dicarboxylic acid, bis(1,2,2,6,6-pentamethyl-4-piperidinyl); 1,5-dioxaspiro{5,5}undecane-3,3-dicarboxylic acid, bis(2,2,6,6-tetramethyl-4-piperidinyl); the condensate of 1-(2-hydroxyethyl)-2,2,6,6-tetramethyl-4-hydroxypiperidine and succinic acid; the condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-tert-octylamino-2,6-dichloro-1,3,5-triazine; 1,2,3,4-butanetetracarboxylic acid, 1,2,2,6,6-pentamethyl-4-piperidinyl tridecyl ester; tetrakis(2,2,6,6-tetramethylpiperidin-4-yl)-1,2,3,4-butanetetracarboxylate; 1,2,3,4-butanetetracarboxylic acid, 2,2,6,6-tetramethyl-4-piperidinyl tridecyl ester; tetrakis(1,2,2,6,6-pentamethylpiperidin-4-yl)-1,2,3,4-butanetetracarboxylate; mixture of 2,2,4,4-tetramethyl-21-oxo-7-oxa-3,20-diazaspiro(5.1.11.2)-heneicosane-20-propanoic acid-dodecylester and 2,2,4,4-tetramethyl-21-oxo-7-oxa-3,20-diazaspiro(5.1.11.2)-heneicosane-20-propanoic acid-tetradecylester; 1H,4H,5H,8H-2,3a,4a,6,7a,8a-hexaazacyclopenta[def]fluorene-4,8-dione, hexahydro-2,6-bis(2,2,6,6-tetramethyl-4-piperidinyl)-; polymethyl[propyl-3-oxy(2',2',6',6'-tetramethyl-4,4'-piperidinyl)]siloxane; polymethyl[propyl-3-oxy(1',2',2',6',6'-pentamethyl-4,4'-piperidinyl)]siloxane; copolymer of methylmethacrylate with ethyl acrylate and 2,2,6,6-tetramethylpiperidin-4-yl acrylate; copolymer of mixed C₂₀ to C₂₄ alpha-olefins and (2,2,6,6-tetramethylpiperidin-4-yl)succinimide; 1,2,3,4-butanetetracarboxylic acid, polymer with β,β,β',β'-tetramethyl-2,4,8,10-tetraoxaspiro[5.5]undecane-3,9-diethanol, 1,2,2,6,6-pentamethyl-4-piperidinyl ester; 1,2,3,4-butanetetracarboxylic acid, polymer with β,β,β',β'-tetramethyl-2,4,8,10-tetraoxaspiro[5.5]undecane-3,9-diethanol, 2,2,6,6-tetramethyl-4-piperidinyl ester copolymer; 1,3-benzenedicarboxamide, N,N'-bis(2,2,6,6-tetramethyl-4-piperidinyl); 1,1'-(1,10-dioxo-1,10-decanediyl)-bis(hexahydro-2,2,4,4,6-pentamethylpyrimidine; ethane diamide, N-(1-acetyl-2,2,6,6-tetramethylpiperidinyl)-N'-dodecyl; formamide, N,N'-1,6-hexanediyldis[N-(2,2,6,6-tetramethyl-4-piperidinyl); D-glucitol, 1,3:2,4-bis-O-(2,2,6,6-tetramethyl-4-piperidinylidene)-; 2,2,4,4-tetramethyl-7-oxa-3,20-diaza-21-oxo-dispiro[5.1.11.2]heneicosane; propanamide, 2-methyl-N-(2,2,6,6-tetramethyl-4-piperidinyl)-2-[(2,2,6,6-tetramethyl-4-piperidinyl)amino]-; 7-oxa-3,20-diazadispiro[5.1.11.2]heneicosane-20-propanoic acid, 2,2,4,4-

tetramethyl-21-oxo-, dodecyl ester; N-(2,2,6,6-tetramethylpiperidin-4-yl)- β -aminopropionic acid dodecyl ester; N-(2,2,6,6-tetramethylpiperidin-4-yl)-N'-aminooxalamide; propanamide, N-(2,2,6,6-tetramethyl-4-piperidinyl)-3-[(2,2,6,6-tetramethyl-4-piperidinyl)amino]-; mixture of 4-hexadecyloxy- and 4-stearyloxy-2,2,6,6-tetramethylpiperidine; 3-dodecyl-1-(1,2,2,6,6-pentamethylpiperidin-4-yl)pyrrolidine-2,5-dione; 3-dodecyl-1-(1-ethanoyl-2,2,6,6-pentamethylpiperidin-4-yl)pyrrolidine-2,5-dione; bis(2,2,6,6-tetramethylpiperidin-4-yl)succinate; bis(1,2,2,6,6-pentamethylpiperidin-4-yl) n-butyl 3,5-di-tert-butyl-4-hydroxybenzylmalonate; tris(2,2,6,6-tetramethylpiperidin-4-yl) nitrilotriacetate; 1,1'-(1,2-ethanediyl)bis(3,3,5,5-tetramethylpiperazinone); 4-benzoyl-2,2,6,6-tetramethylpiperidine; 4-stearyloxy-2,2,6,6-tetramethylpiperidine; bis(1,2,2,6,6-pentamethylpiperidyl)-2-n-butyl-2-(2-hydroxy-3,5-di-tert-butylbenzyl)malonate; 3-n-octyl-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decan-2,4-dione; bis(1-octyloxy-2,2,6,6-tetramethylpiperidyl)sebacate; bis(1-octyloxy-2,2,6,6-tetramethylpiperidyl)succinate; 8-acetyl-3-dodecyl-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decane-2,4-dione; 3-dodecyl-1-(2,2,6,6-tetramethylpiperidin-4-yl)pyrrolidin-2,5-dione; 3-dodecyl-1-(1-ethanoyl-2,2,6,6-tetramethylpiperidin-4-yl)pyrrolidin-2,5-dione; 3-dodecyl-1-(1,2,2,6,6-pentamethylpiperidin-4-yl)pyrrolidine-2,5-dione; a mixture of 4-hexadecyloxy- and 4-stearyloxy-2,2,6,6-tetramethylpiperidine; 2-undecyl-7,7,9,9-tetramethyl-1-oxa-3,8-diaza-4-oxospiro[4.5]decane; 1,5-dioxaspiro{5,5}undecane-3,3-dicarboxylic acid, bis(2,2,6,6-tetramethyl-4-piperidinyl) and 1,5-dioxaspiro{5,5}undecane-3,3-dicarboxylic acid, bis(1,2,2,6,6-pentamethyl-4-piperidinyl); N¹-(β -hydroxyethyl)3,3-pentamethylene-5,5-dimethylpiperazin-2-one; N¹-tert-octyl-3,3,5,5-tetramethyl-diazepin-2-one; N¹-tert-octyl-3,3-pentamethylene-5,5-hexamethylene-diazepin-2-one; N¹-tert-octyl-3,3-pentamethylene-5,5-dimethylpiperazin-2-one; trans-1,2-cyclohexane-bis-(N¹-5,5-dimethyl-3,3-pentamethylene-2-piperazinone); trans-1,2-cyclohexane-bis-(N¹-3,3,5,5-dispiropentamethylene-2-piperazinone); N¹-isopropyl-1,4-diazadispiro-(3,3,5,5)pentamethylene-2-piperazinone; N¹-isopropyl-1,4-diazadispiro-3,3-pentamethylene-5,5-tetramethylene-2-piperazinone; N¹-isopropyl-5,5-dimethyl-3,3-pentamethylene-2-piperazinone; trans-1,2-cyclohexane-bis-N¹-(dimethyl-3,3-pentamethylene-2-piperazinone); N¹-octyl-5,5-dimethyl-3,3-pentamethylene-1,4-diazepin-2-one; N¹-octyl-1,4-diazadispiro-(3,3,5,5)pentamethylene-1,5-diazepin-2-one; and mixtures thereof.

43. The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered hydroxybenzoate compound is according to Formula (III):



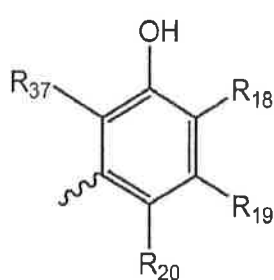
Formula (III)

wherein R_{17} in Formula (III) is a C_1 - C_8 alkyl and R_{18} in Formula (III) is a C_1 - C_{24} alkyl or substituted or unsubstituted C_6 - C_{24} aryl.

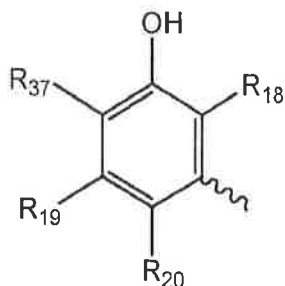
44. The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered hydroxybenzoate compound is selected from the group consisting of 2,4-di-tert-butylphenyl 3,5-di-tert-butyl-4-hydroxybenzoate; hexadecyl 3,5-di-tert-butyl-4-hydroxybenzoate; octadecyl 3,5-di-tert-butyl-4-hydroxybenzoate; octyl 3,5-di-tert-butyl-4-hydroxybenzoate; tetradecyl 3,5-di-tert-butyl-4-hydroxybenzoate; behenyl 3,5-di-tert-butyl-4-hydroxybenzoate; 2-methyl-4,6-di-tert-butylphenyl 3,5-di-tert-butyl-4-hydroxybenzoate and butyl 3-[3-tert-butyl-4-(3,5-di-tert-butyl-4-hydroxybenzoyloxy)phenyl]propionate; and mixtures thereof.

45. The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the acid scavenger is selected from the group consisting of zinc oxide, calcium lactate, natural and synthetic hydrotalcites, natural and synthetic hydrocalumites, alkali metal salts and alkaline earth metal salts of higher fatty acids, calcium stearate, zinc stearate, magnesium behenate, magnesium stearate, sodium stearate, sodium ricinoleate and potassium palmitate, antimony pyrocatecholate, zinc pyrocatecholate and mixtures thereof.

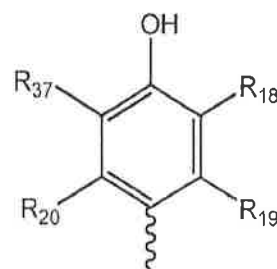
46. The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered phenol antioxidant compound comprises a molecular fragment according to one or more of Formula (IVa), (IVb), or (IVc):



Formula (IVa)



Formula (IVb)



Formula (IVc)

wherein

R_{18} in Formulae (IVa), (IVb) and (IVc) is chosen from hydrogen and a C_{1-4} hydrocarbyl;

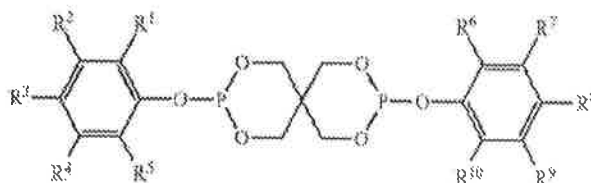
R_{19} and R_{20} in Formulae (IVa), (IVb) and (IVc) are each individually chosen from hydrogen and a C_1 - C_{20} hydrocarbyl; and

R_{37} in Formulae (IVa), (IVb) and (IVc) is chosen from C_1 - C_{12} hydrocarbyl.

47. The thermal and UV light stabilizer composition according to claim 46, wherein R_{18} and R_{37} in Formulae (IVa), (IVb) and (IVc) are chosen from methyl and t-butyl.

48. The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the at least one hindered phenol compound is chosen from: (1,3,5-Tris(4-*t*-butyl-3-hydroxy-2,6-dimethylbenzyl)-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione; 1,3,5-tris(3,5-di-*tert*-butyl-4-hydroxybenzyl)-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione; 1,1,3-Tris(2'-methyl-4'-hydroxy-5'-*t*-butylphenyl)butane; Triethylene glycol bis[3-(3-*t*-butyl-4-hydroxy-5-methylphenyl)propionate]; 4,4'-Thiobis(2-*t*-butyl-5-methylphenol); 2,2'-Thiodiethylene bis[3-(3-*t*-butyl-4-hydroxyl-5-methylphenyl)propionate]; Octadecyl 3-(3'-*t*-butyl-4'-hydroxy-5'-methylphenyl)propionate; Tetrakis(methylene(3-*t*-butyl-4-hydroxy-5-methylhydrocinnamate)methane; *N,N'*-Hexamethylene bis[3-(3-*t*-butyl-4-hydroxy-5-methylphenyl)propionamide]; Di(4-*tert*-butyl-3-hydroxy-2,6-dimethyl benzyl)thiodipropionate; and octadecyl 3,5-di-(*tert*)-butyl-4-hydroxyhydrocinnamate; and mixtures thereof.

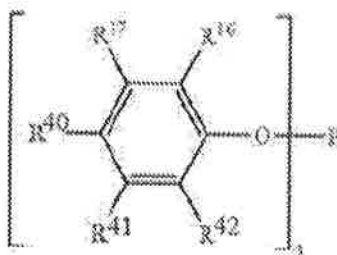
49. The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the phosphite compound is a hindered arylalkyl phosphite compound according to Formula (V):



Formula (V)

wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , R^7 , R^8 , R^9 , and R^{10} in Formula (V) are each individually selected from hydrogen, C_1 - C_{12} alkyl, C_3 - C_{12} cycloalkyl, C_4 - C_{12} alkyl cycloalkyl, C_6 - C_{10} aryl, and C_7 - C_{12} alkylaryl, wherein R^1 and R^5 together comprise at least 5 carbons and at least one of R^1 and R^5 comprises a tertiary carbon, wherein R^6 and R^{10} together comprise at least 5 carbons and at least one of R^6 and R^{10} comprises a tertiary carbon; or

a trisarylphosphite according to Formula (VI):



Formula (VI)

wherein R^{16} , R^{17} , R^{40} , R^{41} , and R^{42} in Formula (VI) are each individually selected from hydrogen, C_1 - C_{20} alkyl, C_3 - C_{20} cycloalkyl, C_4 - C_{20} alkyl cycloalkyl, C_6 - C_{10} aryl, and C_7 - C_{20} alkylaryl;

or mixtures thereof.

50. The thermal and UV light stabilizer composition according to claim 49, wherein the hindered arylalkyl phosphite is selected from the group consisting of bis-(2,6-di-t-butyl-4-methylphenyl)pentaerythritol diphosphite, (bis-(2,4-dicumylphenyl)pentaerythritol diphosphite, bis-(2,4-di-t-butyl-phenyl)pentaerythritol diphosphite, and bis-(2,4,6-tri-t-butyl-phenyl)pentaerythritol diphosphite; and mixtures thereof.

51. The thermal and UV light stabilizer composition according to claim 49, wherein the trisarylphosphite is selected from the group consisting of tris-(2,4-di-t-butylphenyl)phosphite, tris(4-nonylphenyl) phosphite and triphenyl phosphite; and mixtures thereof.

52. The thermal and UV light stabilizer composition according to any one of claims 38-48, wherein the thioester compound is selected from the group consisting of dilauryl thiodipropionate, distearyl thiodipropionate, pentaerythritol tetrakis-(3-dodecylthiopropionate), tetra-alkyl thioethyl thiodisuccinate, 2,12-dihydroxy-4,10-dithia-7-oxatridecamethylene bis[3-(dodecylthio)propionate], polyalkanol esters of alkylthio-alkanoic acids, and dialkyl 3,3'-thiodipropionates; and mixtures thereof.

53. The thermal and UV light stabilizer composition according to any one of claims 38-52, wherein:

the ortho-hydroxyl tris-aryl-s-triazine compound is 2-[4,6-bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl]-5-(octyloxy) phenol;

the hindered amine light stabilizer compound is a mixture of fatty acids, and C₁₂ – C₂₁, C₁₈ unsaturated 2,2,6,6,-tetramethyl – 4- piperidiny l esters;

the hindered hydroxybenzoate compound is 3,5 - di -tert-butyl-4-hydroxybenzoic acid, hexadecyl ester;

the acid scavenger is selected from the group consisting of magnesium oxide, aluminum oxide, magnesium hydroxide, aluminum hydroxide, carbonates thereof and mixtures thereof;

the phosphite compound is bis(2,4-dicumylphenyl) pentaerythritol diphosphite);

the hindered phenol antioxidant compound is 1,3,5 - Tris (4-tert-butyl-3-hydroxy-2,6-dimethyl benzyl)-1,3,5-triazine-2,4,6-(1H, 3H, 5H)-trione; and

the thioester is pentaerythrithol tetrakis-(3-dodecylthiopropionate) or Distearyl thiodipropionate.

54. The thermal and UV light stabilizer composition according to any one of claims 37-52, wherein:

the ortho-hydroxyl tris-aryl-s-triazine compound is present in an amount having an upper limit of 10 wt.% based on a total wt. % of the thermal and UV light stabilizer composition;

the hindered amine light stabilizer compound is present in an amount having an upper limit of 50 wt.% based on the total wt. % of the thermal and UV light stabilizer composition;

the hindered hydroxybenzoate compound is present in an amount having an upper limit of 50 wt. % based on the total wt. % of the thermal and UV light stabilizer composition;

the acid scavenger is present in an amount having an upper limit of 10 wt. % based on the total wt. % of the thermal and UV light stabilizer composition;

the phosphite compound is present in an amount having an upper limit of 40 wt.% based on the total wt. % of the thermal and UV light stabilizer composition; and

the hindered phenol antioxidant compound is present in an amount having an upper limit of 10 wt.% based on the total wt. % of the thermal and UV light stabilizer composition.

55. The thermal and UV light stabilizer composition according to any one of claims 38-53, wherein

the ortho-hydroxyl tris-aryl-s-triazine compound is present in an amount having an upper limit of 10 wt.% based on a total wt. % of the thermal and UV light stabilizer composition;

the hindered amine light stabilizer compound is present in an amount having an upper limit of 50 wt.% based on the total wt. % of the thermal and UV light stabilizer composition;

the hindered hydroxybenzoate compound is present in an amount having an upper limit of 50 wt. % based on the total wt. % of the thermal and UV light stabilizer composition;

the acid scavenger is present in an amount having an upper limit of 10 wt. % based on the total wt. % of the thermal and UV light stabilizer composition;

the phosphite compound is present in an amount having an upper limit of 25 wt.% based on the total wt. % of the thermal and UV light stabilizer composition;

the hindered phenol antioxidant compound is present in an amount having an upper limit of 10 wt.% based on the total wt. % of the thermal and UV light stabilizer composition; and

the thioester compound is present in an amount having an upper limit of 15 wt. % based on the total wt. % of the thermal and UV light stabilizer composition.

56. A composition comprising:

a thermal and UV light stabilizer composition according to any one of claims 37 to 55;

and

a material to be stabilized.

57. The composition according to claim 56, wherein the material to be stabilized is selected from the group consisting of: polyolefins, polyesters, polyethers, polyketones, polyamides, natural and synthetic rubbers, polyurethanes, polystyrenes, high-impact polystyrenes, polyacrylates, polymethacrylates, polyacetals, polyacrylonitriles, polybutadienes, polystyrenes, acrylonitrile-butadiene-styrene, styrene acrylonitrile, acrylate styrene acrylonitrile, cellulosic acetate butyrate, cellulosic polymers, polyimides, polyamideimides, polyetherimides, polyphenylsulfides, polyphenyloxide polysulfones, polyethersulfones, polyvinylchlorides, polycarbonates, polyketones, aliphatic polyketones, thermoplastic olefins, aminoresin cross-linked polyacrylates and polyesters, polyisocyanate cross-linked polyesters and polyacrylates, phenol/formaldehyde, urea/formaldehyde and melamine/formaldehyde resins, drying and non-drying alkyd resins, alkyd resins, polyester resins, acrylate resins cross-linked with melamine resins, urea resins, isocyanates, isocyanurates, carbamates, and epoxy resins, cross-linked epoxy resins derived from aliphatic, cycloaliphatic, heterocyclic and aromatic glycidyl compounds, which are cross-linked with anhydrides or amines, polysiloxanes, Michael

addition polymers, amines, blocked amines with activated unsaturated and methylene compounds, ketimines with activated unsaturated and methylene compounds, polyketimines in combination with unsaturated acrylic polyacetoacetate resins, polyketimines in combination with unsaturated acrylic resins, radiation curable compositions, epoxymelamine resins, organic dyes, cosmetic products, cellulose-based paper formulations, photographic film paper, fibers, waxes, inks, and blends thereof.

58. The composition according to claim 56 or claim 57, wherein the material to be stabilized is selected from the group consisting of thermoplastic olefins, acrylonitrile-butadiene-styrene, polyesters, polyvinylchloride, polyamides, polyurethanes, or homo- and copolymers of propylene, isobutylene, butene, methylpentene, hexene, heptene, octene, isoprene, butadiene, hexadiene, dicyclopentadiene, ethylidene cyclopentene and norbornene.

59. The composition according to any one of claims 56-58, wherein the material to be stabilized is polypropylene or polyethylene.

60. The composition according to claim 56, wherein the material to be stabilized is vinyl siding, vinyl siding trim, a shutter, a gable vent, an eave, fascia, a soffit, a molding, a roofing shingle, a roofing underlayment, a roofing membrane, a batten system, a batten extender, flashing, a tile pan, a ridge vent, a weather block, a hip and ridge system, an eave riser, a taper strip, a gable end wedge, rake trim, a geomembrane, a composite deck material, a railing or a window frame.

61. The composition according to any one of claims 56-59, wherein the composition is a master batch and the thermal and UV light stabilizer composition is present in an amount from about 10 wt.% to about 80 wt. % based on a total weight of the master batch composition, and the material to be stabilized is present in an amount from about 20 wt.% to about 90 wt.% based on the total weight of the master batch composition.

62. The composition according to claim 61, wherein the composition is a master batch and the thermal and UV light stabilizer composition is present in an amount from about 30 wt.% to about 60 wt. % based on a total weight of the master batch composition, and the material to be stabilized is present in an amount from about 40 wt.% to about 70 wt.% based on the total weight of the master batch composition.

63. The composition according to any one of claims 62-63, wherein the composition is a master batch and the thermal and UV light stabilizer composition is present in an amount between about 40 wt.% to about 50 wt. % based on a total weight of the master batch composition, and the material to be stabilized is present in an amount between about 50 wt.% to about 60 wt.% based on the total weight of the master batch composition.

64. The composition according to any one of claims 56-60, wherein the thermal and UV light stabilizer composition is present in an amount from 0.01 wt. % to 5 wt. % based on a total weight of the stabilized composition.

65. The composition according to claim 64, wherein the thermal and UV light stabilizer composition is present in an amount from 0.05 wt. % to 2 wt. % based on a total weight of the stabilized composition.

66. The composition according to any one of claims 64-65, wherein an amount of the ortho-hydroxyl tris-aryl-s-triazine compound is from about 0.002 wt.% to about 0.50 wt.%, an amount of the hindered amine light stabilizer compound is from about 0.01 wt.% to about 1.20 wt.%, an amount of the hindered hydroxybenzoate compound is from about 0.01 wt.% to about 1.20 wt.%, an amount of the acid scavenger is from about 0.001 wt.% to about 0.50 wt.%, an amount of the hindered phenol antioxidant compound is from about 0.001 wt.% to about 0.50 wt.%, and an amount of the phosphite compound is from about 0.005 wt.% to about 1.00 wt.%, based on the total weight of the stabilized composition.

67. The composition according to claim 66, wherein the amount of the ortho-hydroxyl tris-aryl-s-triazine compound is from about 0.004 wt.% to about 0.20 wt.%, the amount of the hindered amine light stabilizer compound is from about 0.02 wt.% to about 0.80 wt.%, the amount of the hindered hydroxybenzoate compound is from about 0.02 wt.% to about 0.80 wt.%, the amount of the acid scavenger is from about 0.003 wt.% to about 0.25 wt.%, the amount of the hindered phenol antioxidant compound is from about 0.002 wt.% to about 0.25 wt.%, and the amount of the phosphite composition is from about 0.01 wt.% to about 0.80 wt.%, based on a total weight of the stabilized composition.

68. The composition according to any one of claims 64-67, wherein the thermal and UV light stabilizer composition further comprises a thioester compound, wherein an amount of the thioester compound is from about 0.001 wt.% to about 0.80 wt.%, based on a total weight of the stabilized composition.

69. The composition according to claim 68, wherein the amount of the thioester compound is from about 0.003 wt.% to about 0.4 wt. %, based on a total weight of the stabilized composition.

70. A process for preparing a composition according to any one of claims 56-69, wherein the material to be stabilized is combined with the thermal and UV light stabilizer composition.

71. The process according to claim 70, wherein the material to be stabilized is selected from the group consisting of thermoplastic olefins, acrylonitrile-butadiene-styrene, polyesters, polyvinylchloride, polyamides, polyurethanes, or homo- and copolymers of propylene, isobutylene, butene, methylpentene, hexene, heptene, octene, isoprene, butadiene, hexadiene, dicyclopentadiene, ethylidene cyclopentene and norbornene.

72. The process according to claim 70 or claim 71, wherein the material to be stabilized is polypropylene or polyethylene.

73. The process according to claim 70, wherein the material to be stabilized is vinyl siding, vinyl siding trim, a shutter, a gable vent, an eave, fascia, a soffit, a molding, a roofing shingle, a roofing underlayment, a roofing membrane, a batten system, a batten extender, flashing, a tile pan, a ridge vent, a weather block, a hip and ridge system, an eave riser, a taper strip, a gable end wedge, rake trim, a geomembrane, a composite deck material, a railing or a window frame.

74. A process for improving processability of a material selected from the group consisting of polyolefins, polyesters, polyethers, polyketones, polyamides, natural and synthetic rubbers, polyurethanes, polystyrenes, high-impact polystyrenes, polyacrylates, polymethacrylates, polyacetals, polyacrylonitriles, polybutadienes, polystyrenes, acrylonitrile-butadiene-styrene, styrene acrylonitrile, acrylate styrene acrylonitrile, cellulosic acetate butyrate, cellulosic polymers, polyimides, polyamideimides, polyetherimides, polyphenylsulfides, polyphenyloxide polysulfones, polyethersulfones, polyvinylchlorides, polycarbonates, polyketones, aliphatic polyketones, thermoplastic olefins, aminoresin cross-linked polyacrylates and polyesters, polyisocyanate cross-linked polyesters and polyacrylates, phenol/formaldehyde, urea/formaldehyde and melamine/formaldehyde resins, drying and non-drying alkyd resins, alkyd resins, polyester resins, acrylate resins cross-linked with melamine resins, urea resins, isocyanates, isocyanurates, carbamates, and epoxy resins, cross-linked epoxy resins derived from aliphatic, cycloaliphatic, heterocyclic and aromatic glycidyl compounds, which are cross-linked with anhydrides or amines, polysiloxanes, Michael addition polymers, amines, blocked amines with activated unsaturated and methylene compounds, ketimines with activated unsaturated and methylene compounds, polyketimines in combination with unsaturated acrylic polyacetoacetate resins, polyketimines in combination with unsaturated acrylic resins, radiation curable compositions, epoxymelamine resins, organic dyes, cosmetic products, cellulose-based paper formulations, photographic film paper, fibers, waxes, inks, and blends thereof, the process comprising adding a stabilizing amount of a stabilizing composition to the material, the stabilizing composition according to any one of claims 37-55.

Int'l Application No. PCT/US2015/028484
Art. 34 Amendment dated 1 March 2016

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of	)
Cytec Industries Inc.	) Confirmation No. 7220
	)
For: Stabilizing Compositions for	)
Stabilizing Materials Against Ultraviolet	)
Light and Thermal Degradation	)
	)
Serial No.: PCT/US2015/028484	)
	) Cytec Ref. No.: 13037S
Filed: 30 April 2015	) (MKG Docket No: 1230-0061WO)

Middletown, Connecticut, March 1, 2016

Mail Stop PCT, Attn: IPEA/EP
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DEMAND AND AMENDMENT UNDER
PCT RULES 53, 54 AND 54bis.1 AND ARTICLE 34

Dear Sir:

This paper is submitted in response to an International Search Report ("ISR") and Written Opinion ("WO") having a mailing date of 24 July 2015. Submitted with this Response is a Demand for International Preliminary Examination pursuant to PCT Rules 53 and 54bis.1. Consistent with PCT Rule 54bis.1(c), arguments and amendments under PCT Article 34 are submitted herewith. The Demand and Article 34 amendments are submitted before 22 months from the earliest priority date of 1 May 2014, namely on or before 1 March 2016, consistent with PCT Rule 54bis.1(a)(i). Please charge Applicant's Deposit Account No. 503342 in the amount of \$ 965.00 for the required charges associated with the Demand.

As a result of this Article 34 Amendment, original Pages 51-73 of the Claims and Abstract are being replaced with Replacement Sheets 51-74, thereby canceling Claims 1-36 and presenting new Claims 37-74. New Claims 37-53 are based on the canceled Claims 1-17, new Claims 56-74 are based on canceled Claims 18-36 and therefore no new matter is presented in new Claims 37-53 and 56-74. Support for newly presented Claims 54 and 55 can be found throughout the application and at least at pages 16-17 of the Published Int'l Patent Application. A new Abstract is presented herein to conform the same in view of the

newly presented Claims. A marked up version and clean version of the Replacement Sheets is submitted herewith.

Novelty, Inventive Step and Industrial Applicability

In Box V of the WO, the Authorized Officer (hereinafter referred to as the "Examiner") indicates that Claims 1-36 are novel and have industrial applicability; however, the Examiner alleges that Claims 1-36 lack inventive step. The Examiner makes reference to the following documents:

D1: U.S. Patent No. 5,214,084;

D2: U.S. Patent No. 4,985,479; and

D3: U.S. Patent Application Publication No. 2009/149581.

The Examiner considers D1 to represent the closest prior art and states that the difference between D1 and independent Claim 1 (now presented as new Claim 37) is that D1 does not teach a composition having an ortho-hydroxyl tris-aryl-s-triazine compound. The Examiner concludes that one skilled in the art would have combined the teaching of D1 and D3 in order to arrive to the stabilizer composition of claim 1 and that no synergistic effect has been shown for the combination of hydroxybenzoate compound and triazine in the present application.

Based on the foregoing, the Examiner alleges that the subject matter of the claims does not meet the requirements of Article 33(3) PCT. Applicant respectfully disagrees and traverses the instant rejection.

D1 is directed to a polypropylene resin containing an α -olefinic copolymer rubber and an inorganic filler is stabilized by incorporating therein the following six (6) components:

- (A) a hindered phenolic compound having a molecular weight of not less than 500,
- (B) a high-molecular hindered piperidine compound such as poly{[6-(1,1,3,3-tetramethylbutyl)amino-1,3,5-triazine-2,4-diyl][(2,2,6,6-tetramethyl-4-piperidyl)-imino]hexamethylene[(2,2,6,6-tetramethyl-4-piperidyl)imino]}],
- (C) a low-molecular hindered piperidine compound such as 2-methyl-2-(2,2,6,6-tetramethyl-4-piperidyl)amino-N-(2,2,6,6-tetramethyl-4-piperidyl)propionamide,
- (D) a benzoate compound such as 2,4-di-*t*-butylphenyl 3,5-di-*t*-butyl-4-hydroxybenzoate,
- (E) a phosphorous compound such as bis(2,4-di-*t*-butylphenyl) pentaerythritol diphosphite, and
- (F) an amide compound such as ethylene-bisstearylamine. This composition may also contain a sulfur compound such as dialkyl thioldipropionate and pentaerythritol tetrakis(3-alkylthiopropionate). The composition disclosed is stable not only against heat and oxidation but also against light.

D1, Abstract.

D3 relates to blends of phosphites and phenols and using such blends as stabilizers for polymers. D3, paragraph [0002]. The composition may also include a light stabilizer such as a hindered amine light stabilizer, a hindered hydroxyl benzoate, a nickel phenolate and/or an ultraviolet light absorber. *See* D3, paragraphs [0033]-[0040]. As noted by the Examiner, one example (Example 47) includes a triazine compound.

In contrast to D1 and D3, the currently claimed invention as recited in new Claim 37 is directed to a thermal and ultraviolet (UV) stabilizer composition that includes:

- (A) a hindered amine light stabilizer compound;
- (B) a hindered hydroxybenzoate compound;
- (C) an ortho-hydroxyl tris-aryl-s-triazine compound;
- (D) a phosphite compound;
- (E) a hindered phenol antioxidant compound; and
- (F) an acid scavenger.

Applicant respectfully asserts that one of ordinary skill in the art would not combine the cited references as alleged by the Examiner. Indeed, there is no indication in either D1 or D3 that any one or more components of the disclosed compositions can or should be omitted, added and/or substituted for any other components known in the art. In particular, D1 is specific with respect to the six (6) components used to stabilize the disclosed polypropylene resin and clearly states:

[a]s a result of *intensive research* conducted by the inventors, it has been found that very excellent performance can be obtained *when a specific* hindered phenolic compound, *a specific* high-molecular hindered piperidine compound, *a specific* low-molecular hindered piperidine compound, *a specific* benzoate compound, *a specific* phosphorus compound, and *a specific* amide compound are used in combination...."

D1, col. 1, lines 55-62 (emphasis added).

Based on the foregoing, it is quite clear that one skilled in the art consulting D1 would not be motivated *at all* to omit, add and/or substitute the disclosed components given the fact D1 unequivocally states that it is the specific disclosed combination that makes the invention work. Thus, it is quite clear that the Examiner is simply picking and choosing various components from the prior art simply to reject the claimed invention as lacking inventive step. Indeed, the Examiner did not even provide a reason as to why one skilled in the art would actually make, or be motivated to make, such a combination. In fact, it appears the Examiner merely combined the two references simply because D3 mentions a triazine

compound, which is lacking from D1. Accordingly, the Examiner is utilizing the claims as a roadmap to pick and choose components disclosed in the prior art, which is evidence of an impermissible hindsight analysis.

In addition to the foregoing, Applicant respectfully submits that D1 does not represent the closest prior art since at the time the instant invention was made, stabilizer compositions utilizing ortho-hydroxyl tris-aryl-s-triazine compounds were known. *See, e.g.*, U.S. Patent Nos. 6,051,164 and U.S. Patent No. 6,843,939. In fact, Examples 2C and 16C of the instant application are representative of a formulation disclosed in U.S. Patent No. 6,843,939 and include: (A) a hindered amine compound, (B) a hindered hydroxybenzoate compound and (C) an ortho-hydroxyl tris-aryl-s-triazine compound. *See*, Tables 1-6 in instant specification. Thus, the advantages of triazine compounds were known at the time of the invention and, contrary to the Examiner's assertion, comparative examples are not needed to show a synergistic effect for the combination of a hydroxybenzoate compound and a triazine compound.

Comparative examples against the closest prior art are provided in the instant specification. *See*, Tables 1-6. The Examples included in the instant specification clearly demonstrate the advantages of the currently claimed invention over the prior art compositions and illustrate that the advantages are demonstrated when the compositions include, *inter alia*, (F) an acid scavenger compound and (E) a phosphite compound. *Compare, e.g.*, Example 2C with Examples 10-14 of Tables 2-5; and Example 16C with Example 17 of Table 6. The demonstrated improvements and advantages of the claimed invention as compared to the compositions according to the state of the art at the time the instant invention was made are not disclosed, suggested or appreciated by any of the cited prior art either taken individually or in combination. Indeed, the Examiner acknowledges at page 5 of the Written Opinion that a synergistic effect has been shown for stabilizer compositions having a combination of an acid scavenger and a hindered phenol, yet concludes that inventive step cannot be acknowledged. Applicant asserts that this is an inherent contradiction since all of the stabilizer compositions as claimed include an acid scavenger and a hindered phenol.

In view of at least the foregoing, Applicant submits currently presented independent Claim 37 is novel and inventive over the cited prior art. Applicant respectfully requests the Examiner deem independent Claim 37 as having inventive step. Since the remaining claims, *i.e.*, newly presented Claims 38-74, all incorporate the subject matter recited in Claim 37,

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Applicant Claims 38-74 are also novel and inventive over the cited prior art for at least the reasons provided above with respect to independent Claim 37.

Conclusion

Applicant submits that the foregoing complies with the requirements of the PCT Rules. However, if for any reason this Statement is insufficient, it is respectfully requested that the undersigned be contacted at the number listed below in an effort to address any issues that may prevent the attached replacement sheets from being entered in the international application and considered during the international examination stage.

In view of the above, the Examiner is respectfully requested to issue a favorable International Preliminary Examination Report establishing that all of the pending claims satisfy the PCT requirements of novelty, inventive step and industrial applicability.

The Applicant believes that no additional fee (other than the aforementioned Demand fee) is due with this paper; however, the Applicant authorizes the payment of any charges that may be necessary to maintain the pendency of the present application to Deposit Account No. 503342.

Please direct any inquiries regarding this Amendment to the Applicant's representative at the address or telephone number listed below.

Respectfully submitted,

By: /Elizabeth A. Galletta/
Elizabeth A. Galletta
Registration No. 52,941
Attorney for Applicant

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What is claimed is:

Claims 1-36. (Canceled)

37. (New) A thermal and ultraviolet (UV) light stabilizer composition comprising:

an ortho-hydroxyl tris-aryl-s-triazine compound;

a hindered amine light stabilizer compound;

a hindered hydroxybenzoate compound;

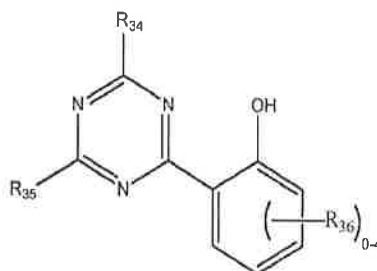
an acid scavenger;

a phosphite compound; and

a hindered phenol antioxidant compound.

38. (New) The thermal and UV light stabilizer composition according to claim 37, further comprising a thioester compound.

39. (New) The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the ortho-hydroxyl tris-aryl-s-triazine compound is a 2-(2'-hydroxyphenyl)-1,3,5-triazine compound according to Formula (I):

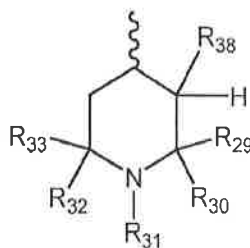


Formula (I)

wherein each of R_{34} and R_{35} in Formula (I) is independently chosen from C_6 - C_{10} aryl optionally substituted, C_1 - C_{10} hydrocarbyl-substituted amino, C_1 - C_{10} acyl and C_1 - C_{10} alkoxyl; and wherein R_{36} in Formula (I) is a substituent that is the same or different at from 0 to 4 positions of the phenoxy portion of Formula I and is independently chosen from hydroxyl, C_1 - C_{12} hydrocarbyl, C_1 - C_{12} alkoxyl, C_1 - C_{12} alkoxyester, and C_1 - C_{12} acyl.

40. (New) The thermal and UV light stabilizer composition according to claim 39, wherein the 2-(2'-hydroxyphenyl)-1,3,5-triazine compound is chosen from: 4,6-bis-(2,4-dimethylphenyl)-2-(2-hydroxy-4-octyloxyphenyl)-s-triazine; 4,6-bis-(2,4-dimethylphenyl)-2-(2,4--dihydroxyphenyl)-s-triazine; 2,4-bis(2,4-dihydroxyphenyl)-6-(4-chlorophenyl)-s-triazine; 2,4-bis[2-hydroxy-4-(2-hydroxy-ethoxy)phenyl]-6-(4-chlorophenyl)-s-triazine; 2,4-bis[2-hydroxy-4-(2-hydroxy-4-(2-hydroxy-ethoxy)phenyl)-6-(2,4-dimethylphenyl)-s-triazine; 2,4-bis[2-hydroxy-4-(2-hydroxyethoxy)phenyl]-6-(4-bromophenyl)-s-triazine; 2,4-bis[2-hydroxy-4-(2-acetoxyethoxy)phenyl]-6-(4-chlorophenyl)-s-triazine; 2,4-bis(2,4-dihydroxyphenyl)-6-(2,4-dimethylphenyl)-s-triazine; 2,4-bis(4-biphenyl)-6-[2-hydroxy-4-[(octyloxycarbonyl)ethylideneoxy]phenyl]-s-triazine; 2,4-bis(4-biphenyl)-6-[2-hydroxy-4-(2-ethylhexyloxy)phenyl]-s-triazine; 2-phenyl-4-[2-hydroxy-4-(3-sec-butyloxy-2-hydroxypropyloxy)phenyl]-6-[2-hydroxy-4-(3-sec-amyloxy-2-hydroxypropyloxy)phenyl]-s-triazine; 2,4-bis(2,4-dimethylphenyl)-6-[2-hydroxy-4-(3-benzyloxy-2-hydroxypropyloxy)phenyl]-s-triazine; 2,4-bis(2-hydroxy-4-n-butyloxyphenyl)-6-(2,4-di-n-butyloxyphenyl)-s-triazine; 2,4-bis(2,4-dimethylphenyl)-6-[2-hydroxy-4-(3-nonyloxy-2-hydroxypropyloxy)-5- α -cumylphenyl]-s-triazine; methylenebis-{2,4-bis(2,4-dimethylphenyl)-6-[2-hydroxy-4-(3-butyloxy-2-hydroxypropoxy)phenyl]-s-triazine}; methylene bridged dimer mixture bridged in the 3:5', 5:5' and 3:3' positions in a 5:4:1 ratio; 2,4,6-tris(2-hydroxy-4-isooctyloxyphenyl)-s-triazine; 2,4-bis(2,4-dimethylphenyl)-6-(2-hydroxy-4-hexyloxy-5- α -cumylphenyl)-s-triazine; 2-(2,4,6-trimethylphenyl)-4,6-bis[2-hydroxy-4-(3-butyloxy-2-hydroxypropyloxy)phenyl]-s-triazine; 2,4,6-tris[2-hydroxy-4-(3-sec-butyloxy-2-hydroxypropyloxy)-phenyl]-s-triazine; mixture of 4,6-bis-(2,4-dimethylphenyl)-2-(2-hydroxy-4-(3-dodecyloxy-2-hydroxypropoxy)phenyl)-s-triazine and 4,6-bis-(2,4-dimethylphenyl)-2-(2-hydroxy-4-(3-tridecyloxy-2-hydroxypropoxy)phenyl)-s-triazine; 4,6-bis-(2,4-dimethylphenyl)-2-(2-hydroxy-4(3-(2-ethylhexyloxy)-2-hydroxypropoxy)-phenyl)-s-triazine; 4,6-diphenyl-2-(4-hexyloxy-2-hydroxyphenyl)-s-triazine; 2-(4,6-Diphenyl-1,3,5-triazin-2-yl)-5-[2-(2-ethylhexanoyloxy)ethoxy]phenol; 2,4,6-tris(2-hydroxy-4-octyloxyphenyl)-1,3,5-triazine; propanoic acid, 2,2',2''-[1,3,5-triazine-2,4,6-triyltris[(3-hydroxy-4, 1-phenylene)oxy]]tris-1,1',1''-triethyl ester; propanoic acid, 2-[4-[4,6-bis([1,1'-biphenyl]-4-yl)-1,3,5-triazin-2-yl]-3-hydroxyphenoxy]-isooctyl ester; and combinations thereof.

41. (New) The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered amine light stabilizer compound comprises a molecular fragment according to Formula (II):



Formula (II)

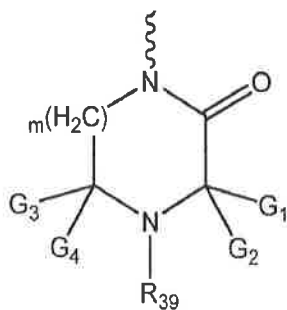
wherein

R₃₁ in Formula (II) is chosen from: hydrogen; OH; C₁-C₂₀ hydrocarbyl; -CH₂CN; C₁-C₁₂ acyl; and C₁-C₁₈ alkoxy;

R₃₈ in Formula (II) is chosen from: hydrogen; and C₁-C₈ hydrocarbyl; and

each of R₂₉, R₃₀, R₃₂, and R₃₃ in Formula (II) is independently chosen from C₁-C₂₀ hydrocarbyl, or R₂₉ and R₃₀ and/or R₃₂ and R₃₃ in Formula (II) taken together with the carbon to which they are attached form a C₅-C₁₀ cycloalkyl;

or Formula (IIa)



Formula (IIa)

wherein

m in Formula (IIa) is an integer from 1 to 2; R₃₉ in Formula (IIa) is chosen from:
hydrogen; OH; C₁-C₂₀ hydrocarbyl; -CH₂CN; C₁-C₁₂ acyl; and C₁-C₁₈ alkoxy; and each of G₁-G₄
in Formula (IIa) is independently chosen from C₁-C₂₀ hydrocarbyl.

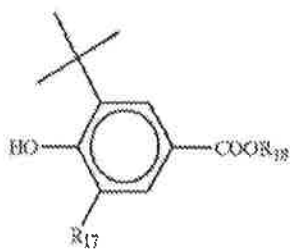
42. (New) The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered amine light stabilizer is chosen from: bis(2,2,6,6-tetramethylpiperidin-4-yl) sebacate; bis(2,2,6,6-tetramethylpiperidin-4-yl)succinate; bis(1,2,2,6,6-pentamethylpiperidin-4-yl)sebacate; bis(1-octyloxy-2,2,6,6-tetramethylpiperidin-4-yl)sebacate; bis(1,2,2,6,6-pentamethylpiperidin-4-yl) n-butyl 3,5-di-tert-butyl-4-hydroxybenzylmalonate; a condensate of 1-(2-hydroxyethyl)-2,2,6,6-tetramethyl-4-hydroxypiperidine and succinic acid; 2,2,6,6-tetramethylpiperidin-4-yl stearate; 2,2,6,6-tetramethylpiperidin-4-yl dodecanate; 1,2,2,6,6-pentamethylpiperidin-4-yl stearate; 1,2,2,6,6-pentamethylpiperidin-4-yl dodecanate; a condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-tert-octylamino-2,6-dichloro-1,3,5-triazine; tris(2,2,6,6-tetramethylpiperidin-4-yl) nitrilotriacetate; tetrakis(2,2,6,6-tetramethylpiperidin-4-yl)-1,2,3,4-butanetetracarboxylate; 4-benzoyl-2,2,6,6-tetramethylpiperidine; 4-stearyloxy-2,2,6,6-tetramethylpiperidine; bis(1,2,2,6,6-pentamethylpiperidyl)-2-n-butyl-2-(2-hydroxy-3,5-di-tert-butylbenzyl)malonate; 3-n-octyl-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decan-2,4-dione; bis(1-octyloxy-2,2,6,6-tetramethylpiperidyl)sebacate; bis(1-octyloxy-2,2,6,6-tetramethylpiperidyl)succinate; a condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-morpholino-2,6-dichloro-1,3,5-triazine; a condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-morpholino-2,6-dichloro-1,3,5-triazine, methylated; a condensate of 2-chloro-4,6-bis(4-n-butylamino-2,2,6,6-tetramethylpiperidyl)-1,3,5-triazine and 1,2-bis(3-aminopropylamino)ethane; a condensate of 2-chloro-4,6-bis(4-n-butylamino-1,2,2,6,6-pentamethylpiperidyl)-1,3,5-triazine and 1,2-bis(3-aminopropylamino)ethane; 8-acetyl-3-dodecyl-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decane-2,4-dione; 3-dodecyl-1-(2,2,6,6-tetramethylpiperidin-4-yl)pyrrolidin-2,5-dione; 3-dodecyl-1-(1-ethanoyl-2,2,6,6-tetramethylpiperidin-4-yl)pyrrolidin-2,5-dione; 3-dodecyl-1-(1,2,2,6,6-pentamethylpiperidin-4-yl)pyrrolidine-2,5-dione; a mixture of 4-hexadecyloxy- and 4-stearyloxy-2,2,6,6-tetramethylpiperidine; a condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-cyclohexylamino-2,6-dichloro-1,3,5-triazine; a condensate of 1,2-bis(3-aminopropylamino)ethane, 2,4,6-trichloro-1,3,5-triazine and 4-butylamino-2,2,6,6-tetramethylpiperidine; 2-undecyl-7,7,9,9-tetramethyl-1-oxa-3,8-diaza-4-oxospiro[4.5]decane; oxo-piperanzinyl-triazines; a reaction product of 7,7,9,9-tetramethyl-2-cycloundecyl-1-oxa-3,8-

diaza-4-oxospiro[4.5]decane and epichlorohydrin; tetrakis(2,2,6,6-tetramethyl-4-piperidyl) butane-1,2,3,4-tetracarboxylate; 1,2,3,4-butanetetracarboxylic acid, tetrakis(1,2,2,6,6-pentamethyl-4-piperidinyl)ester; 1,2,3,4-butanetetracarboxylic acid, 1,2,2,6,6-pentamethyl-4-piperidinyl tridecyl ester; 1,2,3,4-butanetetracarboxylic acid, 2,2,6,6-tetramethyl-4-piperidinyl tridecyl ester; 1,2,3,4-butanetetracarboxylic acid, polymer with 2,2,6,6-tetramethyl-2,4,8,10-tetraoxaspiro[5.5]-undecane-3,9-diethanol, 1,2,2,6,6-pentamethyl-4-piperidinyl ester; 1,2,3,4-butanetetracarboxylic acid, polymer with 2,2,6,6-tetramethyl-2,4,8,10-tetraoxaspiro[5.5]-undecane-3,9-diethanol, 2,2,6,6-tetramethyl-4-piperidinyl ester; bis(1-undecanoxo-2,2,6,6-tetramethylpiperidin-4-yl)carbonate; 1-(2-hydroxy-2-methylpropoxy)-2,2,6,6-tetramethyl-4-piperidinol; 1-(2-hydroxy-2-methylpropoxy)-4-octadecanoyloxy-2,2,6,6-tetramethylpiperidine; 1-(4-octadecanoyloxy-2,2,6,6-tetramethylpiperidin-1-yloxy)-2-octadecanoyloxy-2-methylpropane; 1-(2-hydroxyethyl)-2,2,6,6-tetramethyl-4-piperidinol; a reaction product of 1-(2-hydroxyethyl)-2,2,6,6-tetramethyl-4-piperidinol and dimethylsuccinate; 2,2,4,4-tetramethyl-7-oxa-3,20-diazadispiro[5.1.11.2]heneicosan-21-one; the ester of 2,2,6,6-tetramethyl-4-piperidinol with higher fatty acids; 3-dodecyl-1-(2,2,6,6-tetramethyl-4-piperidyl)pyrrolidine-2,5-dione; 1H-Pyrrole-2,5-dione, 1-octadecyl-, polymer with (1-methylethenyl)benzene and 1-(2,2,6,6-tetramethyl-4-piperidinyl)-1H-pyrrole-2,5-dione; piperazinone, 1,1',1''-[1,3,5-triazine-2,4,6-triyltris[(cyclohexylimino)-2,1-ethanediyl]]tris[3,3,5,5-tetramethyl-; piperazinone, 1,1',1''-[1,3,5-triazine-2,4,6-triyltris[(cyclohexylimino)-2,1-ethanediyl]]tris[3,3,4,5,5-pentamethyl-; the reaction product of 7,7,9,9-tetramethyl-2-cycloundecyl-1-oxa-3,8-diaza-4-oxospiro[4.5]decane and epichlorohydrin; the condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-cyclohexylamino-2,6-dichloro-1,3,5-triazine; the condensate of 1,2-bis(3-aminopropylamino)ethane, 2,4,6-trichloro-1,3,5-triazine and 4-butylamino-2,2,6,6-tetramethylpiperidine; the condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-morpholino-2,6-dichloro-1,3,5-triazine; the condensate of 2-chloro-4,6-bis(4-n-butylamino-2,2,6,6-tetramethylpiperidyl)-1,3,5-triazine and 1,2-bis(3-aminopropylamino)ethane; the condensate of 2-chloro-4,6-bis(4-n-butylamino-1,2,2,6,6-pentamethylpiperidyl)-1,3,5-triazine and 1,2-bis-(3-aminopropylamino)ethane; 2-[(2-hydroxyethyl)amino]-4,6-bis[N-(1-cyclohexyloxy-2,2,6,6-tetramethylpiperidin-4-yl)butylamino-1,3,5-triazine; propanedioic acid, [(4-methoxyphenyl)-methylene]-bis-(1,2,2,6,6-pentamethyl-4-piperidinyl) ester; tetrakis(2,2,6,6-tetramethylpiperidin-4-yl)-1,2,3,4-butanetetracarboxylate;

benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, 1-[2-[3-[3,5-bis(1,1-dimethylethyl)-4-hydroxyphenyl]-1-oxopropoxy]ethyl]-2,2,6,6-tetramethyl-4-piperidinyl ester; N-(1-octyloxy-2,2,6,6-tetramethylpiperidin-4-yl)-N'-dodecyloxalamide; tris(2,2,6,6-tetramethylpiperidin-4-yl) nitrilotriacetate; 1,5-dioxaspiro{5,5}undecane-3,3-dicarboxylic acid, bis(1,2,2,6,6-pentamethyl-4-piperidinyl): 1,5-dioxaspiro{5,5}undecane-3,3-dicarboxylic acid, bis(2,2,6,6-tetramethyl-4-piperidinyl); the condensate of 1-(2-hydroxyethyl)-2,2,6,6-tetramethyl-4-hydroxypiperidine and succinic acid; the condensate of N,N'-bis(2,2,6,6-tetramethylpiperidin-4-yl)hexamethylenediamine and 4-tert-octylamino-2,6-dichloro-1,3,5-triazine; 1,2,3,4-butanetetracarboxylic acid, 1,2,2,6,6-pentamethyl-4-piperidinyl tridecyl ester; tetrakis(2,2,6,6-tetramethylpiperidin-4-yl)-1,2,3,4-butanetetracarboxylate; 1,2,3,4-butanetetracarboxylic acid, 2,2,6,6-tetramethyl-4-piperidinyl tridecyl ester; tetrakis(1,2,2,6,6-pentamethylpiperidin-4-yl)-1,2,3,4-butanetetracarboxylate; mixture of 2,2,4,4-tetramethyl-21-oxo-7-oxa-3.20-diazaspiro(5.1.11.2)-heneicosane-20-propanoic acid-dodecylester and 2,2,4,4-tetramethyl-21-oxo-7-oxa-3.20-diazaspiro(5.1.11.2)-heneicosane-20-propanoic acid-tetradecylester; 1H,4H,5H,8H-2,3a,4a,6,7a,8a-hexaazacyclopenta[def]fluorene-4,8-dione, hexahydro-2,6-bis(2,2,6,6-tetramethyl-4-piperidinyl)-; polymethyl[propyl-3-oxy(2',2',6',6'-tetramethyl-4,4'-piperidinyl)]siloxane; polymethyl[propyl-3-oxy(1',2',2',6',6'-pentamethyl-4,4'-piperidinyl)]siloxane; copolymer of methylmethacrylate with ethyl acrylate and 2,2,6,6-tetramethylpiperidin-4-yl acrylate; copolymer of mixed C₂₀ to C₂₄ alpha-olefins and (2,2,6,6-tetramethylpiperidin-4-yl)succinimide; 1,2,3,4-butanetetracarboxylic acid, polymer with $\beta,\beta,\beta',\beta'$ -tetramethyl-2,4,8,10-tetraoxaspiro[5.5]undecane-3,9-diethanol, 1,2,2,6,6-pentamethyl-4-piperidinyl ester; 1,2,3,4-butanetetracarboxylic acid, polymer with $\beta,\beta,\beta',\beta'$ -tetramethyl-2,4,8,10-tetraoxaspiro[5.5]undecane-3,9-diethanol, 2,2,6,6-tetramethyl-4-piperidinyl ester copolymer; 1,3-benzenedicarboxamide, N,N'-bis(2,2,6,6-tetramethyl-4-piperidinyl); 1,1'-(1,10-dioxo-1,10-decanediyl)-bis(hexahydro-2,2,4,4,6-pentamethylpyrimidine; ethane diamide, N-(1-acetyl-2,2,6,6-tetramethylpiperidinyl)-N'-dodecyl; formamide, N,N'-1,6-hexanediyldis[N-(2,2,6,6-tetramethyl-4-piperidinyl)]; D-glucitol, 1,3:2,4-bis-O-(2,2,6,6-tetramethyl-4-piperidinylidene)-; 2,2,4,4-tetramethyl-7-oxa-3,20-diaza-21-oxo-dispiro[5.1.11.2]heneicosane; propanamide, 2-methyl-N-(2,2,6,6-tetramethyl-4-piperidinyl)-2-[(2,2,6,6-tetramethyl-4-piperidinyl)amino]-; 7-oxa-3,20-diazadispiro[5.1.11.2]heneicosane-20-propanoic acid, 2,2,4,4-tetramethyl-21-oxo-, dodecyl ester; N-(2,2,6,6-tetramethylpiperidin-4-yl)- β -aminopropionic acid

dodecyl ester; N-(2,2,6,6-tetramethylpiperidin-4-yl)-N'-aminooxalamide; propanamide, N-(2,2,6,6-tetramethyl-4-piperidinyl)-3-[(2,2,6,6-tetramethyl-4-piperidinyl)amino]-; mixture of 4-hexadecyloxy- and 4-stearyloxy-2,2,6,6-tetramethylpiperidine; 3-dodecyl-1-(1,2,2,6,6-pentamethylpiperidin-4-yl)pyrrolidine-2,5-dione; 3-dodecyl-1-(1-ethanoyl-2,2,6,6-pentamethylpiperidin-4-yl)pyrrolidine-2,5-dione; bis(2,2,6,6-tetramethylpiperidin-4-yl)succinate; bis(1,2,2,6,6-pentamethylpiperidin-4-yl) n-butyl 3,5-di-tert-butyl-4-hydroxybenzylmalonate; tris(2,2,6,6-tetramethylpiperidin-4-yl) nitrilotriacetate; 1,1'-(1,2-ethanediyl)bis(3,3,5,5-tetramethylpiperazinone); 4-benzoyl-2,2,6,6-tetramethylpiperidine; 4-stearyloxy-2,2,6,6-tetramethylpiperidine; bis(1,2,2,6,6-pentamethylpiperidinyl)-2-n-butyl-2-(2-hydroxy-3,5-di-tert-butylbenzyl)malonate; 3-n-octyl-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decan-2,4-dione; bis(1-octyloxy-2,2,6,6-tetramethylpiperidinyl)sebacate; bis(1-octyloxy-2,2,6,6-tetramethylpiperidinyl)succinate; 8-acetyl-3-dodecyl-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decane-2,4-dione; 3-dodecyl-1-(2,2,6,6-tetramethylpiperidin-4-yl)pyrrolidin-2,5-dione; 3-dodecyl-1-(1-ethanoyl-2,2,6,6-tetramethylpiperidin-4-yl)pyrrolidin-2,5-dione; 3-dodecyl-1-(1,2,2,6,6-pentamethylpiperidin-4-yl)pyrrolidine-2,5-dione; a mixture of 4-hexadecyloxy- and 4-stearyloxy-2,2,6,6-tetramethylpiperidine; 2-undecyl-7,7,9,9-tetramethyl-1-oxa-3,8-diaza-4-oxospiro[4.5]decane; 1,5-dioxaspiro{5,5}undecane-3,3-dicarboxylic acid, bis(2,2,6,6-tetramethyl-4-piperidinyl) and 1,5-dioxaspiro{5,5}undecane-3,3-dicarboxylic acid, bis(1,2,2,6,6-pentamethyl-4-piperidinyl); N¹-(β-hydroxyethyl)3,3-pentamethylene-5,5-dimethylpiperazin-2-one; N¹-tert-octyl-3,3,5,5-tetramethyl-diazepin-2-one; N¹-tert-octyl-3,3-pentamethylene-5,5-hexamethylene-diazepin-2-one; N¹-tert-octyl-3,3-pentamethylene-5,5-dimethylpiperazin-2-one; trans-1,2-cyclohexane-bis-(N¹-5,5-dimethyl-3,3-pentamethylene-2-piperazinone); trans-1,2-cyclohexane-bis-(N¹-3,3,5,5-dispiropentamethylene-2-piperazinone); N¹-isopropyl-1,4-diazadispiro-(3,3,5,5)pentamethylene-2-piperazinone; N¹-isopropyl-1,4-diazadispiro-3,3-pentamethylene-5,5-tetramethylene-2-piperazinone; N¹-isopropyl-5,5-dimethyl-3,3-pentamethylene-2-piperazinone; trans-1,2-cyclohexane-bis-N¹-(dimethyl-3,3-pentamethylene-2-piperazinone); N¹-octyl-5,5-dimethyl-3,3-pentamethylene-1,4-diazepin-2-one; N¹-octyl-1,4-diazadispiro-(3,3,5,5)pentamethylene-1,5-diazepin-2-one; and mixtures thereof.

43. (New) The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered hydroxybenzoate compound is according to Formula (III):



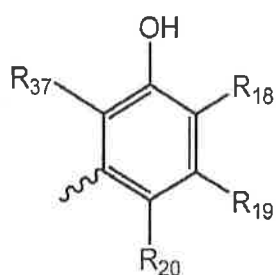
Formula (III)

wherein R_{17} in Formula (III) is a C_1 - C_8 alkyl and R_{18} in Formula (III) is a C_1 - C_{24} alkyl or substituted or unsubstituted C_6 - C_{24} aryl.

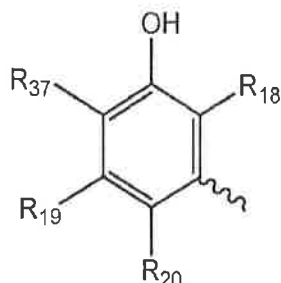
44. (New) The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered hydroxybenzoate compound is selected from the group consisting of 2,4-di-tert-butylphenyl 3,5-di-tert-butyl-4-hydroxybenzoate; hexadecyl 3,5-di-tert-butyl-4-hydroxybenzoate; octadecyl 3,5-di-tert-butyl-4-hydroxybenzoate; octyl 3,5-di-tert-butyl-4-hydroxybenzoate; tetradecyl 3,5-di-tert-butyl-4-hydroxybenzoate; behenyl 3,5-di-tert-butyl-4-hydroxybenzoate; 2-methyl-4,6-di-tert-butylphenyl 3,5-di-tert-butyl-4-hydroxybenzoate and butyl 3-[3-t-butyl-4-(3,5-di-t-butyl-4-hydroxybenzoyloxy)phenyl]propionate; and mixtures thereof.

45. (New) The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the acid scavenger is selected from the group consisting of zinc oxide, calcium lactate, natural and synthetic hydrotalcites, natural and synthetic hydrocalumites, alkali metal salts and alkaline earth metal salts of higher fatty acids, calcium stearate, zinc stearate, magnesium behenate, magnesium stearate, sodium stearate, sodium ricinoleate and potassium palmitate, antimony pyrocatecholate, zinc pyrocatecholate and mixtures thereof.

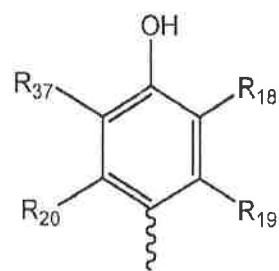
46. (New) The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the hindered phenol antioxidant compound comprises a molecular fragment according to one or more of Formula (IVa), (IVb), or (IVc):



Formula (IVa)



Formula (IVb)



Formula (IVc)

wherein

R₁₈ in Formulae (IVa), (IVb) and (IVc) is chosen from hydrogen and a C₁₋₄ hydrocarbyl;

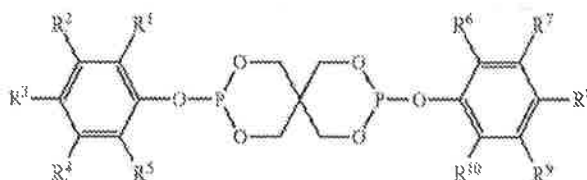
R₁₉ and R₂₀ in Formulae (IVa), (IVb) and (IVc) are each individually chosen from hydrogen and a C₁-C₂₀ hydrocarbyl; and

R₃₇ in Formulae (IVa), (IVb) and (IVc) is chosen from C₁-C₁₂ hydrocarbyl.

47. (New) The thermal and UV light stabilizer composition according to claim 46, wherein R₁₈ and R₃₇ in Formulae (IVa), (IVb) and (IVc) are chosen from methyl and t-butyl.

48. (New) The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the at least one hindered phenol compound is chosen from: (1,3,5-Tris(4-*t*-butyl-3-hydroxy-2,6-dimethylbenzyl)-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione; 1,3,5-tris(3,5-di-*tert*-butyl-4-hydroxybenzyl)-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione; 1,1,3-Tris(2'-methyl-4'-hydroxy-5'-*t*-butylphenyl)butane; Triethylene glycol bis[3-(3-*t*-butyl-4-hydroxy-5-methylphenyl)propionate]; 4,4'-Thiobis(2-*t*-butyl-5-methylphenol); 2,2'-Thiodiethylene bis[3-(3-*t*-butyl-4-hydroxy-5-methylphenyl)propionate]; Octadecyl 3-(3'-*t*-butyl-4'-hydroxy-5'-methylphenyl)propionate; Tetrakis(methylene(3-*t*-butyl-4-hydroxy-5-methylhydrocinnamate)methane; *N,N'*-Hexamethylene bis[3-(3-*t*-butyl-4-hydroxy-5-methylphenyl)propionamide]; Di(4-*tert*-butyl-3-hydroxy-2,6-dimethyl benzyl)thiodipropionate; and octadecyl 3,5-di-(*tert*)-butyl-4-hydroxyhydrocinnamate; and mixtures thereof.

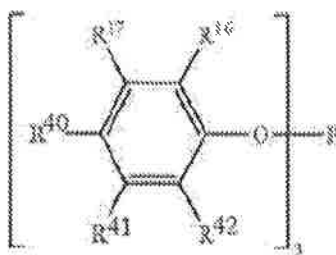
49. (New) The thermal and UV light stabilizer composition according to any one of the preceding claims, wherein the phosphite compound is a hindered arylalkyl phosphite compound according to Formula (V):



Formula (V)

wherein R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , R^7 , R^8 , R^9 , and R^{10} in Formula (V) are each individually selected from hydrogen, C_1 - C_{12} alkyl, C_3 - C_{12} cycloalkyl, C_4 - C_{12} alkyl cycloalkyl, C_6 - C_{10} aryl, and C_7 - C_{12} alkylaryl, wherein R^1 and R^5 together comprise at least 5 carbons and at least one of R^1 and R^5 comprises a tertiary carbon, wherein R^6 and R^{10} together comprise at least 5 carbons and at least one of R^6 and R^{10} comprises a tertiary carbon; or

a trisarylphosphite according to Formula (VI):



Formula (VI)

wherein R^{16} , R^{17} , R^{40} , R^{41} , and R^{42} in Formula (VI) are each individually selected from hydrogen, C_1 - C_{20} alkyl, C_3 - C_{20} cycloalkyl, C_4 - C_{20} alkyl cycloalkyl, C_6 - C_{10} aryl, and C_7 - C_{20} alkylaryl;

or mixtures thereof.

50. (New) The thermal and UV light stabilizer composition according to claim 49, wherein the hindered arylalkyl phosphite is selected from the group consisting of bis-(2,6-di-t-butyl-4-methylphenyl)pentaerythritol diphosphite, (bis-(2,4-dicumylphenyl)pentaerythritol diphosphite, bis-(2,4-di-t-butyl-phenyl)pentaerythritol diphosphite, and bis-(2,4,6-tri-t-butyl-phenyl)pentaerythritol diphosphite; and mixtures thereof.

51. (New) The thermal and UV light stabilizer composition according to claim 49, wherein the trisarylphosphite is selected from the group consisting of tris-(2,4-di-t-butylphenyl)phosphite, tris(4-nonylphenyl) phosphite and triphenyl phosphite; and mixtures thereof.

52. (New) The thermal and UV light stabilizer composition according to any one of claims 38-48, wherein the thioester compound is selected from the group consisting of dilauryl thiodipropionate, distearyl thiodipropionate, pentaerythritol tetrakis-(3-dodecylthiopropionate), tetra-alkyl thioethyl thiodisuccinate, 2,12-dihydroxy-4,10-dithia-7-oxatridecamethylene bis[3-(dodecylthio)propionate], polyalkanol esters of alkylthio-alkanoic acids, and dialkyl 3,3'-thiodipropionates; and mixtures thereof.

53. (New) The thermal and UV light stabilizer composition according to any one of claims 38-52, wherein:

the ortho-hydroxyl tris-aryl-s-triazine compound is 2-[4,6-bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl]-5-(octyloxy) phenol;

the hindered amine light stabilizer compound is a mixture of fatty acids, and C₁₂ – C₂₁, C₁₈ unsaturated 2,2,6,6,-tetramethyl – 4- piperidiny l esters;

the hindered hydroxybenzoate compound is 3,5 - di -tert-butyl-4-hydroxybenzoic acid, hexadecyl ester;

the acid scavenger is selected from the group consisting of magnesium oxide, aluminum oxide, magnesium hydroxide, aluminum hydroxide, carbonates thereof and mixtures thereof;

the phosphite compound is bis(2,4-dicumylphenyl) pentaerythritol diposphite);

the hindered phenol antioxidant compound is 1,3,5 - Tris (4-tert-butyl-3-hydroxy-2,6-dimethyl benzyl)-1,3,5-triazine-2,4,6-(1H, 3H, 5H)-trione; and

the thioester is pentaerythritol tetrakis-(3-dodecylthiopropionate) or Distearyl thiodipropionate.

54. (New) The thermal and UV light stabilizer composition according to any one of claims 37-52, wherein:

the ortho-hydroxyl tris-aryl-s-triazine compound is present in an amount having an upper limit of 10 wt.% based on a total wt. % of the thermal and UV light stabilizer composition;

the hindered amine light stabilizer compound is present in an amount having an upper limit of 50 wt.% based on the total wt. % of the thermal and UV light stabilizer composition;

the hindered hydroxybenzoate compound is present in an amount having an upper limit of 50 wt. % based on the total wt. % of the thermal and UV light stabilizer composition;

the acid scavenger is present in an amount having an upper limit of 10 wt. % based on the total wt. % of the thermal and UV light stabilizer composition;

the phosphite compound is present in an amount having an upper limit of 40 wt.% based on the total wt. % of the thermal and UV light stabilizer composition; and

the hindered phenol antioxidant compound is present in an amount having an upper limit of 10 wt.% based on the total wt. % of the thermal and UV light stabilizer composition.

55. (New) The thermal and UV light stabilizer composition according to any one of claims 38-53, wherein

the ortho-hydroxyl tris-aryl-s-triazine compound is present in an amount having an upper limit of 10 wt.% based on a total wt. % of the thermal and UV light stabilizer composition;

the hindered amine light stabilizer compound is present in an amount having an upper limit of 50 wt.% based on the total wt. % of the thermal and UV light stabilizer composition;

the hindered hydroxybenzoate compound is present in an amount having an upper limit of 50 wt. % based on the total wt. % of the thermal and UV light stabilizer composition;

the acid scavenger is present in an amount having an upper limit of 10 wt. % based on the total wt. % of the thermal and UV light stabilizer composition;

the phosphite compound is present in an amount having an upper limit of 25 wt.% based on the total wt. % of the thermal and UV light stabilizer composition;

the hindered phenol antioxidant compound is present in an amount having an upper limit of 10 wt.% based on the total wt. % of the thermal and UV light stabilizer composition; and

the thioester compound is present in an amount having an upper limit of 15 wt. % based on the total wt. % of the thermal and UV light stabilizer composition.

56. (New) A composition comprising:

a thermal and UV light stabilizer composition according to any one of claims 37 to 55;

and

a material to be stabilized.

57. (New) The composition according to claim 56, wherein the material to be stabilized is selected from the group consisting of: polyolefins, polyesters, polyethers, polyketones, polyamides, natural and synthetic rubbers, polyurethanes, polystyrenes, high-impact polystyrenes, polyacrylates, polymethacrylates, polyacetals, polyacrylonitriles, polybutadienes, polystyrenes, acrylonitrile-butadiene-styrene, styrene acrylonitrile, acrylate styrene acrylonitrile, cellulosic acetate butyrate, cellulosic polymers, polyimides, polyamideimides, polyetherimides, polyphenylsulfides, polyphenyloxide polysulfones, polyethersulfones, polyvinylchlorides, polycarbonates, polyketones, aliphatic polyketones, thermoplastic olefins, aminoresin cross-linked polyacrylates and polyesters, polyisocyanate cross-linked polyesters and polyacrylates, phenol/formaldehyde, urea/formaldehyde and melamine/formaldehyde resins, drying and non-drying alkyd resins, alkyd resins, polyester resins, acrylate resins cross-linked with melamine resins, urea resins, isocyanates, isocyanurates, carbamates, and epoxy resins, cross-linked epoxy resins derived from aliphatic, cycloaliphatic, heterocyclic and aromatic glycidyl compounds, which are cross-linked with anhydrides or amines, polysiloxanes, Michael

addition polymers, amines, blocked amines with activated unsaturated and methylene compounds, ketimines with activated unsaturated and methylene compounds, polyketimines in combination with unsaturated acrylic polyacetoacetate resins, polyketimines in combination with unsaturated acrylic resins, radiation curable compositions, epoxymelamine resins, organic dyes, cosmetic products, cellulose-based paper formulations, photographic film paper, fibers, waxes, inks, and blends thereof.

58. (New) The composition according to claim 56 or claim 57, wherein the material to be stabilized is selected from the group consisting of thermoplastic olefins, acrylonitrile-butadiene-styrene, polyesters, polyvinylchloride, polyamides, polyurethanes, or homo- and copolymers of propylene, isobutylene, butene, methylpentene, hexene, heptene, octene, isoprene, butadiene, hexadiene, dicyclopentadiene, ethylidene cyclopentene and norbornene.

59. (New) The composition according to any one of claims 56-58, wherein the material to be stabilized is polypropylene or polyethylene.

60. (New) The composition according to claim 56, wherein the material to be stabilized is vinyl siding, vinyl siding trim, a shutter, a gable vent, an eave, fascia, a soffit, a molding, a roofing shingle, a roofing underlayment, a roofing membrane, a batten system, a batten extender, flashing, a tile pan, a ridge vent, a weather block, a hip and ridge system, an eave riser, a taper strip, a gable end wedge, rake trim, a geomembrane, a composite deck material, a railing or a window frame.

61. (New) The composition according to any one of claims 56-59, wherein the composition is a master batch and the thermal and UV light stabilizer composition is present in an amount from about 10 wt.% to about 80 wt. % based on a total weight of the master batch composition, and the material to be stabilized is present in an amount from about 20 wt.% to about 90 wt.% based on the total weight of the master batch composition.

62. (New) The composition according to claim 61, wherein the composition is a master batch and the thermal and UV light stabilizer composition is present in an amount from about 30 wt.% to about 60 wt. % based on a total weight of the master batch composition, and the material to be stabilized is present in an amount from about 40 wt.% to about 70 wt.% based on the total weight of the master batch composition.

63. (New) The composition according to any one of claims 62-63, wherein the composition is a master batch and the thermal and UV light stabilizer composition is present in an amount between about 40 wt.% to about 50 wt. % based on a total weight of the master batch composition, and the material to be stabilized is present in an amount between about 50 wt.% to about 60 wt.% based on the total weight of the master batch composition.

64. (New) The composition according to any one of claims 56-60, wherein the thermal and UV light stabilizer composition is present in an amount from 0.01 wt. % to 5 wt. % based on a total weight of the stabilized composition.

65. (New) The composition according to claim 64, wherein the thermal and UV light stabilizer composition is present in an amount from 0.05 wt. % to 2 wt. % based on a total weight of the stabilized composition.

66. (New) The composition according to any one of claims 64-65, wherein an amount of the ortho-hydroxyl tris-aryl-s-triazine compound is from about 0.002 wt.% to about 0.50 wt.%, an amount of the hindered amine light stabilizer compound is from about 0.01 wt.% to about 1.20 wt.%, an amount of the hindered hydroxybenzoate compound is from about 0.01 wt.% to about 1.20 wt.%, an amount of the acid scavenger is from about 0.001 wt.% to about 0.50 wt.%, an amount of the hindered phenol antioxidant compound is from about 0.001 wt.% to about 0.50 wt.%, and an amount of the phosphite compound is from about 0.005 wt.% to about 1.00 wt.%, based on the total weight of the stabilized composition.

67. (New) The composition according to claim 66, wherein the amount of the ortho-hydroxyl tris-aryl-s-triazine compound is from about 0.004 wt.% to about 0.20 wt.%, the amount of the hindered amine light stabilizer compound is from about 0.02 wt.% to about 0.80 wt.%, the amount of the hindered hydroxybenzoate compound is from about 0.02 wt.% to about 0.80 wt.%, the amount of the acid scavenger is from about 0.003 wt.% to about 0.25 wt.%, the amount of the hindered phenol antioxidant compound is from about 0.002 wt.% to about 0.25 wt.%, and the amount of the phosphite composition is from about 0.01 wt.% to about 0.80 wt.%, based on a total weight of the stabilized composition.

68. (New) The composition according to any one of claims 64-67, wherein the thermal and UV light stabilizer composition further comprises a thioester compound, wherein an amount of the thioester compound is from about 0.001 wt.% to about 0.80 wt.%, based on a total weight of the stabilized composition.

69. (New) The composition according to claim 68, wherein the amount of the thioester compound is from about 0.003 wt.% to about 0.4 wt. %, based on a total weight of the stabilized composition.
70. (New) A process for preparing a composition according to any one of claims 56-69, wherein the material to be stabilized is combined with the thermal and UV light stabilizer composition.
71. (New) The process according to claim 70, wherein the material to be stabilized is selected from the group consisting of thermoplastic olefins, acrylonitrile-butadiene-styrene, polyesters, polyvinylchloride, polyamides, polyurethanes, or homo- and copolymers of propylene, isobutylene, butene, methylpentene, hexene, heptene, octene, isoprene, butadiene, hexadiene, dicyclopentadiene, ethylidene cyclopentene and norbornene.
72. (New) The process according to claim 70 or claim 71, wherein the material to be stabilized is polypropylene or polyethylene.
73. (New) The process according to claim 70, wherein the material to be stabilized is vinyl siding, vinyl siding trim, a shutter, a gable vent, an eave, fascia, a soffit, a molding, a roofing shingle, a roofing underlayment, a roofing membrane, a batten system, a batten extender, flashing, a tile pan, a ridge vent, a weather block, a hip and ridge system, an eave riser, a taper strip, a gable end wedge, rake trim, a geomembrane, a composite deck material, a railing or a window frame.

74. (New) A process for improving processability of a material selected from the group consisting of polyolefins, polyesters, polyethers, polyketones, polyamides, natural and synthetic rubbers, polyurethanes, polystyrenes, high-impact polystyrenes, polyacrylates, polymethacrylates, polyacetals, polyacrylonitriles, polybutadienes, polystyrenes, acrylonitrile-butadiene-styrene, styrene acrylonitrile, acrylate styrene acrylonitrile, cellulosic acetate butyrate, cellulosic polymers, polyimides, polyamideimides, polyetherimides, polyphenylsulfides, polyphenyloxide polysulfones, polyethersulfones, polyvinylchlorides, polycarbonates, polyketones, aliphatic polyketones, thermoplastic olefins, aminoresin cross-linked polyacrylates and polyesters, polyisocyanate cross-linked polyesters and polyacrylates, phenol/formaldehyde, urea/formaldehyde and melamine/formaldehyde resins, drying and non-drying alkyd resins, alkyd resins, polyester resins, acrylate resins cross-linked with melamine resins, urea resins, isocyanates, isocyanurates, carbamates, and epoxy resins, cross-linked epoxy resins derived from aliphatic, cycloaliphatic, heterocyclic and aromatic glycidyl compounds, which are cross-linked with anhydrides or amines, polysiloxanes, Michael addition polymers, amines, blocked amines with activated unsaturated and methylene compounds, ketimines with activated unsaturated and methylene compounds, polyketimines in combination with unsaturated acrylic polyacetoacetate resins, polyketimines in combination with unsaturated acrylic resins, radiation curable compositions, epoxymelamine resins, organic dyes, cosmetic products, cellulose-based paper formulations, photographic film paper, fibers, waxes, inks, and blends thereof, the process comprising adding a stabilizing amount of a stabilizing composition to the material, the stabilizing composition according to any one of claims 37-55.

ABSTRACT

~~Stabilizing~~ Stabilizer compositions for stabilizing materials against degradation due to thermal and ultraviolet light exposure are disclosed herein. In some instances, the ~~stabilizing~~ stabilizer compositions include an ortho-hydroxyl tris-aryl-s-triazine compound; a hindered amine light stabilizer compound; a hindered hydroxybenzoate compound; a phosphite compound, an acid scavenger and/or thioester; and a hindered phenol antioxidant compound.