

[SS 4] Scale and inhibition and polycarboxylic acid and copolymer

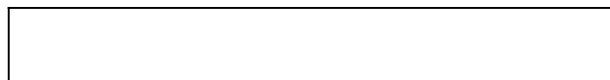
Results in EPODOC 11

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1/11 © EPODOC / EPO

PN - [CA2985380](#) A1 20161117
PR - US201562160686P
20150513; WO2016US31402
20160509
AP - CA20162985380 20160509
DT - I
CCI - [C02F5/10](#) ; [C09K8/528](#) ;
[C09K8/592](#)
PA - DOW GLOBAL TECHNOLOGIES LLC
[US]
TI - THERMALLY STABLE **SCALE**
INHIBITOR COMPOSITIONS
AB - The present invention relates to
a thermally stable
polymeric **scale** inhibitor
compositions and use thereof.
Preferably, the polymeric **scale**
inhibitor is a **polycarboxylic acid**
copolymer comprising a styrene
sulfonic **acid** group. The
polymeric **scale** inhibitor
compositions of the present
invention are particularly
suitable for high pressure/high
temperature **scale inhibition**
treatment of oil and gas
production wells and/or
subterranean formations.



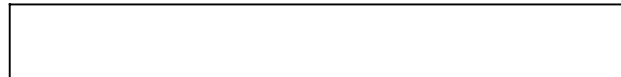
2/11 © EPODOC / EPO

PN - [CN106242087](#) A 20161221
PR - CN20161764221 20160822
AP - CN20161764221 20160822
DT - I
PA - SHANDONG XINTAI WATER-TREATMENT TECH CO LTD
TI - Environment-friendly type **scale** and corrosion inhibitor XT-619B

AB - The invention aims to provide an environment-friendly type **scale** and corrosion inhibitor XT-619B. The environment-friendly type **scale** and corrosion inhibitor XT-619B is characterized by being prepared from the following components in percentage by mass: 20-25% of organic phosphonic carboxylic **acid**, 15-20% of a sulfonate-containing **copolymer**, 10-15% of **polycarboxylic acid**, 10-15% of hexamethylene tetramine, 15-20% of polyaspartate, 3-8% of benzotriazole, 5-7% of sodium gluconate, 5-8% of zinc chloride and 7-10% of hydrolyzed polymaleic anhydride. The environment-friendly type **scale** and corrosion inhibitor XT-619B disclosed by the invention has the advantages that the environment-friendly type **scale** and corrosion inhibitor XT-619B is a phosphorus-free compound, so that external supply of fungus nutrition can be stopped, quick propagation of funguses is effectively restrained, and environmental pollution caused by blowdown of a circulating water system is greatly reduced; the environment-friendly type **scale** and corrosion inhibitor XT-619B has good **scale-inhibition** dispersibility and corrosion-inhibition properties; and besides, the environment-friendly type **scale** and corrosion inhibitor XT-619B can be biologically degraded, so that environmental pollution is reduced.

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PN - [WO2017099840](#) A1 20170615
 PR - US201562263893P 20151207
 AP - WO2016US31403 20160509
 DT - *; Rep
 CT - |EP| ISR (A1)
[EP0792998](#) A1 19970903
 [XI] (ROHM & HAAS [US])
 [X] 1
 * page 2, line 47 through page 3,
 line 8, page 4, lines 2-7, lines 17-
 57, page 6, Table 1, polymer 17,
 page 8, Table 6B, Examples,
 claims *
 [I] 2-8;
[US4952327](#) A 19900828
 [I] (AMJAD ZAHID [US], et al)
 [I] 1-8
 * column 2, line 39 through
 column 3, line 26, column 3, line
 63 through column 4, line 55,
 Table 1, column 7, line 32
 through column 8, line 3, claims
 *;
[WO2014176419](#) A1 20141030
 [I] (KEMIRA OYJ [FI], et al)
 [I] 1-8
 * page 3, paragraph [0009], page
 4, paragraph [0014], page 6,
 paragraph [0021] through page
 7, paragraph [0025], page 7,



paragraphs [0028] and [0029],
 page 13, paragraphs [0050],
 [0051] and [0053], claims *;
[FR2803304](#) A1 20010706
 [I] (CECA SA [FR])
 [I] 1
 * page 2, lines 32-36, page 3,
 lines 7-12, 18-22 and 29-35,
 page 4, lines 13-29, page 5, line
 31 through page 6, line 4, claim
 5 *;
[US4288327](#) A 19810908
 [A] (GODLEWSKI IRENE T, et al)
 [A] 1-8
 * column 2, line 44 through
 column 3, line 21, column 14,
 lines 29-63, claims *

- CCI - [C09K8/528](#)
- PA - DOW GLOBAL TECHNOLOGIES LLC
[US]
- TI - THERMALLY STABLE **SCALE**
INHIBITOR COMPOSITIONS
- AB - The present invention relates to
a thermally stable
polymeric **scale** inhibitor
compositions and use thereof.
Preferably, the polymeric **scale**
inhibitor is a **polycarboxylic acid**
copolymer comprising
acrylic **acid**, methacrylic **acid**,
and styrene sulfonic **acid**. The
polymeric **scale** inhibitor
compositions of the present
invention are particularly
suitable for high pressure/high
temperature **scale inhibition**
treatment of oil, gas, geothermal
production wells and/or
subterranean formations.

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- PN - [WO2016182980](#) A1 20161117
- PR - US201562160686P 20150513
- AP - WO2016US31402 20160509
- DT - *; Rep
- CT - |EP| ISR (A1)
[EP0792998](#) A1 19970903 [XI] (ROHM & HAAS [US])

[X] 1

* page 2, line 47 through page 3, line 8, page 4, lines 2-7, lines 17-57, page 6, Table 1, polymer 17, page 8, Table 6B, Examples, claims *

[I] 2-8;

[US4952327](#) A 19900828 [XI] (AMJAD ZAHID [US], et al)

[X] 1

* column 2, line 39 through column 3, line 26, column 3, line 63 through column 4, line 55, Table 1, column 7, line 32 through column 8, line 3, claims *

[I] 2-8;

[WO2014176419](#) A1 20141030 [XI] (KEMIRA OYJ [FI], et al)

[X] 1

* page 3, paragraph [0009], page 4, paragraph [0004], page 6, paragraph [0021] through page 7, paragraph [0025], page 7, paragraphs [0028] and [0029], page 13, paragraphs [0050], [0051] and [0053], claims *

[I] 2-8;

[FR2803304](#) A1 20010706 [XI] (CECA SA [FR])

[X] 1

* page 2, lines 32-36, page 3, lines 7-12, 18-22 and 29-35, page 4, lines 13-29, page 5, line 31 through page 6, line 4, claim 5 *

[I] 2-8;

[US4288327](#) A 19810908 [XI] (GODLEWSKI IRENE T, et al)

[X] 1

* column 2, line 44 through column 3, line 21, column 14, lines 29-63, claims *

[I] 2-8

- CCI - [C02F5/10](#) ; [C09K8/528](#) ; [C09K8/592](#)
- PA - DOW GLOBAL TECHNOLOGIES LLC [US]
- TI - THERMALLY STABLE **SCALE** INHIBITOR COMPOSITIONS
- AB - The present invention relates to a thermally stable polymeric **scale** inhibitor compositions and use thereof. Preferably, the polymeric **scale** inhibitor is a **polycarboxylic acid copolymer** comprising a styrene sulfonic **acid** group. The polymeric **scale** inhibitor compositions of the present invention are particularly suitable for high pressure/high temperature **scale inhibition** treatment of oil and gas production wells and/or subterranean formations.

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PN - [CN105565513](#) A 20160511

PR - CN20141531713 20141010

AP - CN20141531713 20141010

DT - I

CT - || STSE (A)

[CN1417138](#) A 20030514 [X] (INST OF BEIJING YANSHAN PETROC [CN])

[X] 1-16

* 说明书第1页第5段至第9页第2段 *;

[CN102786158](#) A 20121121 [A] (CHINA PETROLEUM & CHEMICAL, et al)

[A] 1-16

* 全文 *;

[CN103420497](#) A 20131204 [A] (UNIV NANJING SCIENCE & TECH)

[A] 1-16

* 全文 *

- PA - CHINA PETROLEUM & CHEM CORP; SINOPEC RES INST PETROLEUM
- TI - Composite corrosion and **scale** inhibitor and its preparation method and use
- AB - The invention discloses a composite corrosion and **scale** inhibitor and its preparation method and use. The preparation method comprises adding an inorganic **acid** solution and sulfate into a zinc-containing aqueous solution, carrying out stirring to obtain a uniform mixture, carrying out standing until precipitates are formed, taking the supernatant and compounding the supernatant and one or more of an organic phosphonic **acid** corrosion and **scale** inhibitor, an inorganic phosphoric **acid** corrosion and **scale** inhibitor and a **polycarboxylic acid copolymer**. The preparation method can effectively prevent turbidity and deposition of the composite corrosion and **scale** inhibitor and guarantees excellent corrosion and **scale inhibition** effects of the composite corrosion and **scale** inhibitor.

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- PN - [CN103787516](#) A 20140514
- PNFP - CN103787516B B 20151216
- PR - CN20121430513 20121101
- AP - CN20121430513 20121101
- DT - I
- CT - || STSE (A)
[CN102351328](#) A 20120215 [Y] (TIANJIN RUOZE CHEMICAL TECHNOLOGY CO LTD)
[Y] 1-10
说明书发明内容部分
[CN101244872](#) A 20080820 [Y] (BAOSHAN IRON & STEEL [CN])
[Y] 1-10
发明内容部分
- PA - (A)
CHINA PETROLEUM & CHEMICAL; BEIJING RES INST CHEM IND
- TI - (A)
Composite corrosion and **scale** inhibitor, and its application in circulating cooling water treatment
- AB - (A)
The invention discloses a composite corrosion and **scale** inhibitor, and its application in circulating cooling water treatment. The composite corrosion and **scale** inhibitor contains oxalic **acid** and/or oxalate, a sulfonic group-containing **copolymer**, a **scale inhibition** additive and a zinc salt, the **scale inhibition** additive is at least one of organic phosphonic **acid**, phosphorus-free **polycarboxylic acid** and phosphorus-free polyacid anhydride, and a weight ratio of oxalic **acid** and/or oxalate to the sulfonic group-containing **copolymer** to the **scale inhibition** additive to the zinc salt by zinc ion is 10-30: 2.5-5.5:2-12:1. The composite corrosion and **scale** inhibitor contains no phosphorus or has a low concentration of total phosphorus, is environmentally-friendly, and is especially suitable for circulating water with the sum of the total alkalinity and the total hardness of above 100mg. The above zinc salt formula containing oxalic **acid** and/or oxalate realize excellent **scale** and corrosion **inhibition** effects.

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- PN - [CN103539895](#) A 20140129
- PR - CN20131475310 20131013
- AP - CN20131475310 20131013
- DT - I
- PA - SHAANXI SHENGMAI PETROLEUM CO
- TI - Preparation method of **polycarboxylic acid scale-inhibition** dispersant
- AB - The invention discloses a preparation method of a **polycarboxylic acid scale-inhibition** dispersant and relates to a preparation method of an organic complex for **scale** removal. The preparation method comprises the following steps of 1, mixing maleic anhydride and distilled water, replacing air by N₂, carrying out heating to a temperature of 70 DEG C, respectively and dropwisely adding a water-sodium methallyl sulfonate-methylacryloylamino oxalic **acid** mixed solution and an ammonium persulfate aqueous solution into the reaction system, after dropwise addition is finished, carrying out heating to a temperature of 80 DEG C, carrying out heat preservation for 2h, and carrying out cooling to a room temperature, 2, adjusting a pH value of the reaction solution to 7 by a NaOH solution having mass fraction of 30% to obtain a yellow or brownish red solution, and 3, pouring the yellow or brownish red solution into methanol with stirring so that white precipitates are separated, carrying out filtration, and carrying out vacuum drying on the precipitates at a temperature of 60 DEG C. Through the **polycarboxylic acid scale-inhibition** dispersant, calcium carbonate lattices produce severe distortion and a crystal increasing rate is reduced. Multi-carboxyl and sulfonic functional groups of the **copolymer** produce chelating solubilization and dispersion effects on calcium ions so that calcium carbonate **scale** formation is inhibited.

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- PN - [CN101973644](#) A 20110216
- PR - CN20101524101 20101029
- AP - CN20101524101 20101029
- DT - I
- CT - || STSE (A)
[CN101423299](#) A 20090506 [] (YINGXIONG ZHANG [CN], et al)
[CN101172726](#) A 20080507 [] (ZHIGANG YANG [CN], et al)
[CN1338433](#) A 20020306 [] (LI BENGGAO [CN], et al)
[CA2069789](#) C 20051004 [] (CHEN SHIH-RUEY T [US], et al)
- CTNP - || STSE (A)
[] <<工业水处理>> 20050831
李亚红等
海水淡化反渗透系统中的膜用化学品 第13-17页 2-4 第25卷, 第8期 2
- PA - UNIVNANJING
- TI - Reverse osmosis compound **scale** inhibitor
- AB - The invention provides a reverse osmosis compound **scale** inhibitor and belongs to the field of reverse osmosis water treatment. The **scale** inhibitor comprises the following

components in percentage by weight: 10 to 20 percent of 1-hydroxyethylidene-1,1-diphosphonic **acid**, 30 to 40 percent of hydrolytic polymaleic anhydride, 30 to 40 percent of polyacrylic **acid** and 10 to 20 percent of sulfonated styrene-maleic anhydride **copolymer**, and the **scale** inhibitor comprises also comprises a bactericide. The reverse osmosis compound **scale** inhibitor fully utilizes the synergistic effect among organic phosphorous **scale** inhibitors, **polycarboxylic acid scale** inhibitors and sulfonic **acid scale** inhibitors, has good **scale inhibition** and dispersion performance; and when used in a reverse osmosis water inflow system, the **scale** inhibitor can effectively lighten pollution of calcium carbonate, calcium sulfate and silicate to reverse osmosis membranes and prolongs the cleaning period and service life of the reverse osmosis system.

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- PN - [CN101624238](#) A 20100113
- PR - CN2009190087 20090731
- AP - CN2009190087 20090731
- DT - I
- PA - BEIJING TUOKAI CHEMICAL TECHNO
- TI - **Scale** and corrosion inhibiting agent for circular cooling water of oxygen preparation plant as well as method and application thereof
- AB - The invention relates to a **scale** and corrosion inhibiting agent for the circular cooling water of an oxygen preparation plant as well as a method and an application thereof, which are characterized in that the **scale** and corrosion inhibiting agent comprises the following components: organic phosphonate, **polycarboxylic acid** multicomponent **copolymer**, copper corrosion inhibiting agent, zinc salt, polyaspartic **acid** and water, wherein the water is solvent. The **scale** and corrosion inhibiting agent can effectively prevent the formation of calcium carbonate, disperse calcium carbonate microcrystals, change the crystallization state of the calcium carbonate and have favorable performance for preventing the formation of calcium carbonate **scale** in the circular cooling water. The invention has the effect of preventing calcium carbonate incrustation under the complicated condition that the circular cooling water of the oxygen preparation plant is not only used by a high-temperature heat exchanger, but also used by low-temperature freezing water equipment and low-temperature equipment. Only 10-50 mg/L of **scale** and corrosion inhibiting agent can achieve the requirement of **scale** and corrosion **inhibition**, and the invention greatly saves the industrial water consumption amount and the economic cost and has favorable economic and social benefits.

10/11 © EPODOC / EPO

- PN - [CN101412565](#) A 20090422
- PR - CN20081197947 20081128
- AP - CN20081197947 20081128
- DT - I
- PA - WUHAN HAILI TECHNOLOGY CHEMICAL [CN]
- TI - Efficient **scale** corrosion inhibitor for carbon steel system
- AB - The invention discloses a high-efficiency **scale** and corrosion inhibitor for a carbon

steel system, and relates to an agent which is used for industrial recirculated cooling water and can inhibit **scale** and corrosion. The **scale** and corrosion inhibitor consists of organic phosphonate substances, **polycarboxylic acid** substances, acrylic **acid copolymer** substances, polyhydroxycarboxylic **acid** or sodium salt of the polyhydroxycarboxylic **acid**, borax, zinc salt and water. The **scale** and corrosion inhibitor has scientific and reasonable formulas, contains the organic phosphonate substances, the **polycarboxylic acid** substances and acrylic **acid** copolymers which have the function of **scale inhibition**, and also contains substances such as gluconic **acid** sodium salt, the borax and the zinc salt which have the function of corrosion **inhibition**; and a preparation of the **scale** and corrosion inhibitor has higher functions of **scale** and corrosion **inhibition**, and can solve corrosion and scaling problems of the carbon steel system. After the prior carbon steel adopts the **scale** and corrosion inhibitor, the corrosion rate is between 0.05 and 0.07mm/y, and the **scale** inhibiting rate is between 97.5 and 99 percent. The **scale** and corrosion inhibitor has simple production and can be obtained by sequentially adding various raw materials into a reaction kettle according to various formulas to stir evenly.

11/11 © EPODOC / EPO

PN - [US5659008](#) A 19970819

PR - US19920994922 19921222; US19950421621 19950413

AP - US19950421621 19950413

DT - **

CT - [US2306918](#) A []; [US3052655](#) A [];
[US3351520](#) A []; [US3846380](#) A [];
[US4169924](#) A []; [US4363797](#) A [];
[US4839461](#) A []; [US4996292](#) A [];
[US5057597](#) A []; [US5152902](#) A [];
[US5219952](#) A []; [US5286810](#) A [];
[US5296578](#) A []; [US5328631](#) A [];
[US5393868](#) A []; [US5519110](#) A [];
[US5521279](#) A []

CCI - [C08G69/00](#) ; [C08G69/10](#) ; [C08G69/36](#) ; [C08G73/02](#) ; [C08G73/1092](#) ; [C11D3/3719](#)

PA - BAYER AG [DE]

TI - **Copolymer** of polyaspartic **acid** and **polycarboxylic acid**

AB - Copolymers of polyaspartic **acid** which are suitable for the **Inhibition** of **scale** deposition were obtained by reacting maleic **acid**, an additional **polycarboxylic acid** and ammonia in a stoichiometric excess, at 120 DEG -350 DEG C., preferably 180 DEG -300 DEG C., to provide copolymers of polysuccinimide. In a second embodiment, a polyamine was added to the reaction mix. These intermediate polysuccinimide copolymers could then be converted to the salts of copolymers of polyaspartic **acid** by hydrolysis with a hydroxide. Such copolymers are useful in preventing deposition of **scale** from water and find applications in treating water. Other applications include **scale** prevention additives for detergents. In addition, such copolymers inhibit dental tartar and plaque formation.