

Search query (3): [SP]: 1. a method of recovering oil from a reservoir during gas injection into said reservoir comprising the steps of: (a) at least periodically injecting gas and a foam-forming composition into a reservoir wherein the foam-forming composition comprises an effective foam-forming amount of an anionic surfactant of the formula i: [ftimg=81301602] wherein r is linear or branched c2-c22 alkyl r1, r2, and r3 are independently h or linear or branched c1-c18 alkyl r4 is h, ch2so3-m+, or ch2oh r5 is oh, so3-m+, or a group of the formula: [ftimg=81301603] r6 is h, ch2so3-m+, or ch2oh and m+ is h+, or a monovalent or divalent cation, wherein one of r4 and r6 is h and wherein one or two of r4, r5, and r6 contains so3-m+ and (b) contacting hydrocarbons in the reservoir with the foam and the gas so as to assist in the recovery of hydrocarbons from the reservoir. 2. the method of claim 1 wherein r is linear c4-c16 alkyl. 3. the method of claim 1 wherein r1, r2, and r3 are each h. 4. the method of claim 1 wherein r4 is ch2so3-m+ or ch2oh, r5 is so3-m+, and r6 is h. 5. a method of claim 1 wherein the anionic surfactant is: sodium 2-hexan-2-yloxypropane-1,3-disulfonate sodium 2-hexan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-octan-2-yloxypropane-1,3-disulfonate sodium 2-octan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-decan-2-yloxypropane-1,3-disulfonate sodium 2-decan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-dodecan-2-yloxypropane-1,3-disulfonate sodium 2-dodecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-tetradecan-2-yloxypropane-1,3-disulfonate sodium 2-tetradecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-hexadecan-2-yloxypropane-1,3-disulfonate sodium 2-hexadecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-octadecan-2-yloxypropane-1,3-disulfonate sodium 2-octadecan-2-yloxy-3-hydroxypropane-1-sulfonate or mixtures of two or more thereof. 6. the method of claim 1 wherein the foam-forming composition further comprises one or more alpha olefin sulfonate, said one or more alpha olefin sulfonate having from 10 to 18 carbons. 7. the method of claim 6 wherein the one or more alpha olefin sulfonate comprises both hydroxy-sulfonates and alkene-sulfonates. 8. the method of claim 7 wherein the one or more alpha olefin sulfonate has 12 carbons.

Results: 16

Search history

Search PN=(WO2014193730) (Results 1)

1:

Search [SP]: field of the invention [0001] this invention relates to a foam-forming composition and method of use thereof for enhanced oil recovery. specifically, the foam-forming composition comprises an anionic sulfonate surfactant wherein the anionic sulfonate surfactant is biodegradable and has low aquatic toxicity. said foam-forming composition may optionally comprise an alpha-olefin sulfonate. background of the invention [0002] the present invention relates to a composition and method for enhancing the recovery of petroleum from an oil-bearing formation.[0003] in the recovery of oil from reservoirs, the use of primary production techniques (i.e., the use of only the initial formation energy to recover the crude oil) followed by the secondary technique of waterflooding, recovers only a portion of the original oil present in the formation.[0004] moreover, the use of certain enhanced oil recovery (eor) techniques is also known in the art. these techniques can generally be classified as either a thermally based recovery technique, e.g., utilizing steam, or a gas drive method that can be operated under miscible or non-miscible conditions.[0005] the gases which are commonly employed in gas-drive methods include for example, nitrogen, carbon dioxide, methane, mixtures of methane with ethane, propane, butane, and higher hydrocarbon homologues. this class of gases includes both natural gas and produced gas.[0006] a typical procedure involves injecting a slug of co2 followed by the injection of a higher viscosity fluid such as water to "push" the co2 see, for example, the discussion in u.s. pat. no. 2,623,596. moreover, u.s. pat. no. 3,065,790 indicates that this process may be more cost effectively employed if the slug of co2 is relatively small. in fact, as illustrated by u.s. pat. no. 3,529,668, this type of recovery procedure is typically performed in "water alternating gas (wag)" cycles.[0007] because of the viscosity and density differences between the co2 and the oil (i.e., viscosity of co2 is only 5 to 10 percent of the viscosity of light oil), the co2 tends to bypass much of the oil when flowing through the pores of the reservoir rock.[0008] one proposed solution to this problem associated with the bypassing of the co2 includes the injection of water which contains a surfactant, with the co2. in particular, surfactants have been proposed as a means for generating a foam or an emulsion in the formation. see, for example, u.s. pat. nos. 4,380,266 4,860,828 and u.s. pat. no. 5,502,538.[0009] the purpose of this foam is to divert the flow of the co2 into that portion of the formation containing high oil saturation.[0010] one surfactant composition includes alpha-olefin sulfonate (aos) surfactants and in particular c12 aos, i.e., an aos having a carbon chain length of 12.[0011] furthermore, although aos surfactants are largely known as "good foamers", the creation of an effective foam requires that the surfactant be completely soluble in the injection water. solubility is limited when employing aos having longer chain lengths, i.e., greater than about c10, by the amount of salt in the injection water or formation brine. this is a particular problem when the salt concentration is above about 15 weight percent.[0012] in such environments, the aos can separate out and become adsorbed onto the formation rock. thus, any foam which is formed is not effectively propagated through the reservoir.[0013] there is a need for suitable foam-forming composition comprising foaming agents with improved brine tolerance which may be used alone or in conjunction with existing surfactants, such as aos surfactants. moreover, there is a need for brine tolerant foam-forming compositions that are environmentally friendly that will allow enhanced oil recovery in a safe and efficient manner. summary of the invention [0014] the present invention is such a foam-forming composition and method of use for enhanced oil recovery wherein the foam-forming composition exhibits improved brine tolerance, is biodegradable, and has low aquatic toxicity.[0015] in one aspect, the present invention is a foam-forming composition and method of using said foam-forming composition to recover hydrocarbons from a reservoir during gas injection into said reservoir comprising the steps of: (a) at least periodically injecting gas and a foam-forming composition into a reservoir wherein the foam-forming composition comprises an effective foam-forming amount of an anionic surfactant of the formula i:[ftimg=81301582]wherein r is linear or branched c2-c22 alkyl, preferably linear c4-c16 alkylr1, r2, and r3 are independently h or linear or branched c1-c18 alkyl, preferably hr4 is h, ch2so3-m+, or ch2ohr5 is oh, so3-m+, or a group of the formula:[ftimg=81301583]r6 is h, ch2so3-m+, or ch2oh, preferably h and m+ is h+, or a monovalent or divalent cation, wherein one of r4 and r6 is h and wherein one or two of r4, r5, and r6 contains so3-m+ and (b) contacting hydrocarbons in the reservoir with the foam and the gas so as to assist in the recovery of hydrocarbons from the reservoir.[0025] in a preferred embodiment, the anionic surfactant is: sodium 2-hexan-2-yloxypropane-1,3-disulfonate sodium 2-hexan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-octan-2-yloxypropane-1,3-disulfonate sodium 2-octan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-decan-2-yloxypropane-1,3-disulfonate sodium 2-decan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-dodecan-2-yloxypropane-1,3-disulfonate sodium 2-dodecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-tetradecan-2-yloxypropane-1,3-disulfonate sodium 2-tetradecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-hexadecan-2-yloxypropane-1,3-disulfonate sodium 2-hexadecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-octadecan-2-yloxypropane-1,3-sulfonate sodium 2-octadecan-2-yloxy-3-hydroxypropane-1-sulfonate or mixtures of two or more thereof.[0026] the method described herein above wherein the foam-forming composition further comprises one or more alpha olefin sulfonate, said one or more alpha olefin sulfonate preferably having from 10 to 18 carbons, more preferably 12 carbons, preferably the one or more alpha olefin sulfonate comprises both hydroxy-sulfonates and alkene-sulfonates. detailed description of the preferred embodiments [0027] the present invention relates to a method and composition for enhancing the recovery of oil from oil-bearing formations, or reservoir, and in particular, compositions including brine with a total dissolved solids (tds) content from about 10 to 15 weight percent to as high as about 20 to 25 weight percent. furthermore, it can be employed in a reservoir having temperatures as high as 250 degrees fahrenheit with typical temperatures of reservoirs in which it is employed being above about 100 degrees fahrenheit [0028] this method utilizes a foam-forming composition which can be effectively employed with gas. in particular, this foam-forming composition includes one or more anionic surfactant of formula i:[ftimg=81301584][0029] wherein r is linear or branched c2-c22 alkyl[0030] r1, r2, and r3 are independently h or linear or branched c1-c18 alkyl[0031] r4 is h, ch2so3-m+, or ch2oh[0032] r5 is oh, so3-m+, or a group of the formula:[ftimg=81301585][0033] r6 is h, ch2so3-m+, or ch2oh and [0034] m+ is h+ or a monovalent or divalent cation, such as sodium, potassium, ammonium, calcium, magnesium, or alkylated ammonium,[0035] wherein one of r4 and r6 is h and wherein one or two of r4, r5, or r6 contains so3-m+.[0036] the processes described below for preparing the surfactants of the invention may result in the formation of mixtures of compounds of formula i. although the individual compounds of formula i may be isolated from the mixture, this step is not necessary, and indeed it is sometimes preferred that the surfactant be used in the form of the mixture. thus, surfactants that are mixtures of compounds of formula i are contemplated and are within the scope of the invention.[0037] preferred surfactants of formula i include compounds of formula i-1 (or mixtures thereof), which are compounds of formula i wherein r is linear c2-c22 alkyl. further preferably, r is linear or branched, more preferably linear, c4-c16 alkyl.[0038] preferred compounds of formulae i and i-1 include compounds of formula i-2, which are compounds of formula i or i-1 wherein r1 is h.[0039] preferred compounds of formulae i, i-1, and i-2 include compounds of formula i-3, which are compounds of formula i, i-1 or i-2 wherein r2 is h.[0040] preferred compounds of formulae i, i-1, (Results 16)

Search [SP]: 1. a method of recovering oil from a reservoir during gas injection into said reservoir comprising the steps of: (a) at least periodically injecting gas and a foam-forming composition into a reservoir wherein the foam-forming composition comprises an effective foam-forming amount of an anionic surfactant of the formula i: [ftimg=81301602] wherein r is linear or branched c2-c22 alkyl r1, r2, and r3 are independently h or linear or branched c1-c18 alkyl r4 is h, ch2so3-m+, or ch2oh r5 is oh, so3-m+, or a group of the formula: [ftimg=81301603] r6 is h, ch2so3-m+, or ch2oh and m+ is h+, or a monovalent or divalent cation, wherein one of r4 and r6 is h and wherein one or two of r4, r5, and r6 contains so3-m+ and (b) contacting hydrocarbons in the reservoir with the foam and the gas so as to assist in the recovery of hydrocarbons from the reservoir. 2. the method of claim 1 wherein r is linear c4-c16 alkyl. 3. the method of claim 1 wherein r1, r2, and r3 are each h. 4. the method of claim 1 wherein r4 is ch2so3-m+ or ch2oh, r5 is so3-m+, and r6 is h. 5. a method of claim 1 wherein the anionic surfactant is: sodium 2-hexan-2-yloxypropane-1,3-disulfonate sodium 2-hexan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-octan-2-yloxypropane-1,3-disulfonate sodium 2-octan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-decan-2-yloxypropane-1,3-disulfonate sodium 2-decan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-dodecan-2-yloxypropane-1,3-disulfonate sodium 2-dodecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-tetradecan-2-yloxypropane-1,3-disulfonate sodium 2-tetradecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-hexadecan-2-yloxypropane-1,3-disulfonate sodium 2-hexadecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-octadecan-2-yloxypropane-1,3-disulfonate sodium 2-octadecan-2-yloxy-3-hydroxypropane-1-sulfonate or mixtures of two or more thereof. 6. the method of claim 1 wherein the foam-forming composition further comprises one or more alpha olefin sulfonate, said one or more alpha olefin sulfonate having from 10 to 18 carbons. 7. the method of claim 6 wherein the one or more alpha olefin sulfonate comprises both hydroxy-sulfonates and alkene-sulfonates. 8. the method of claim 7 wherein the one or more alpha olefin sulfonate has 12 carbons.

sodium 2-dodecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-tetradecan-2-yloxypropane-1,3-disulfonate sodium 2-tetradecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-hexadecan-2-yloxypropane-1,3-disulfonate sodium 2-hexadecan-2-yloxy-3-hydroxypropane-1-sulfonate sodium 2-octadecan-2-yloxypropane-1,3-disulfonate sodium 2-octadecan-2-yloxy-3-hydroxypropane-1-sulfonate or mixtures of two or more thereof. 6. the method of claim 1 wherein the foam-forming composition further comprises one or more alpha olefin sulfonate, said one or more alpha olefin sulfonate having from 10 to 18 carbons. 7. the method of claim 6 wherein the one or more alpha olefin sulfonate comprises both hydroxy-sulfonates and alkene-sulfonates. 8. the method of claim 7 wherein the one or more alpha olefin sulfonate has 12 carbons. (Results 16)

Title: ENHANCED OIL RECOVERY METHOD EMPLOYING A BIODEGRADABLE BRINE TOLERANT FOAM-FORMING COMPOSITION

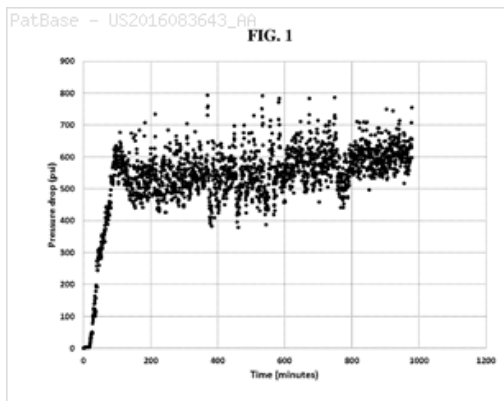
Abstract: Source: US2016083643A This invention relates to a foam-forming composition and method of use thereof for enhanced oil recovery. Said foam-forming composition comprises an anionic sulfonate surfactant wherein the anionic sulfonate surfactant is biodegradable and has low aquatic toxicity. The method for recovering oil from a reservoir comprises the periodic injection of gas and said foam-forming composition into the reservoir and contacting the oil in the reservoir with the foam so as to assist in the recovery of oil from the reservoir.

Classifications:

International (IPC 8-9): C09K8/594 E21B43/16 (Advanced/Invention)

CPC: E21B43/168 C09K8/594

US: 166/305.1



Family:

Publication number	Publication date	Application number	Application date
AR096511 AA	20160113	AR2014P102143	20140530
CA2913048 AA	20151119	CA20142913048	20140522
CN105229114 A	20160106	CN201480028710	20140522
CO7590608 A2	20160429	CO20150303644	20151222
EP3004282 A1	20160413	EP20140732741	20140522
IN11155DN2015 A	20160520	IN2015DN11155	20151207
MX2015015659 A1	20160317	MX20150015659	20140522
US2016083643 AA	20160324	US20140780219	20140522
WO14193730 A1	20141204	WO2014US39142	20140522

Priority:

US20120829532P 20120531 US20130829532P 20130531 WO2014US39142 20140522
 US20140780219 20140522

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Assignee(s): (std): DOW GLOBAL TECH LLC ; DOW GLOBAL TECHNOLOGIES INC ; DOW GLOBAL TECHNOLOGIES LLC

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Agent(s): SMART AND BIGGAR; LUZ CLEMENCIA DE PAEZ; ANDREWS PAUL DAVID; CHRISTY M ROBERT

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: Focus detection device

Abstract: Source: US5502538A This focus detection device uses electric charge accumulation type photoelectric conversion devices. The time period for the next episode of electric charge accumulation by these photoelectric conversion devices is calculated based upon the time period for the current episode of electric charge accumulation, so as to keep the maximum level of an electrical signal for focus detection output from the photoelectric conversion devices less than or equal to a previously determined target level. The accumulation of electric charge by the photoelectric conversion devices is then performed according to this calculated electric charge accumulation time period, and the resultant electrical signal for focus detection is output. A monitor photoelectric conversion device is provided for monitoring the electric charge accumulation state of the photoelectric conversion devices, and this monitor photoelectric conversion device outputs a monitor electrical signal correlated to the average amount of electric charge accumulation of the photoelectric conversion devices. If the electrical signal for focus detection output by the photoelectric conversion devices comes to exceed the maximum input level for its A/D conversion device, then the standard level for the monitor electrical signal is reduced, so as to ensure quick termination of the next episode of electric charge accumulation by the photoelectric conversion devices.

Classifications:

International (IPC 8-9): G02B7/28 G02B7/36

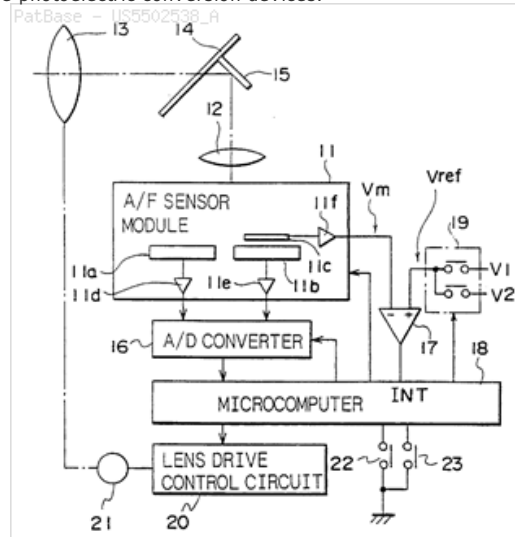
G03B13/36 (Advanced/Invention)

International (IPC 1-7): G02B7/28 G03B13/36 H04N3/14

CPC: G02B7/36

European: G02B7/36

US: 348/297 354/402 396/96



Family:

Publication number	Publication date	Application number	Application date
JP6003580 A2	19940114	JP19920161069	19920619
US5502538 A	19960326	US19950458460	19950602

Priority:

JP19920161069 19920619
US19940197562 19940217

US19930076956 19930616

US19950458460 19950602

Probable Assignee:

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Assignee(s): (std):

NIPPON KOGAKU KK

Assignee(s):

NIKON CORP

Inventor(s): (std):

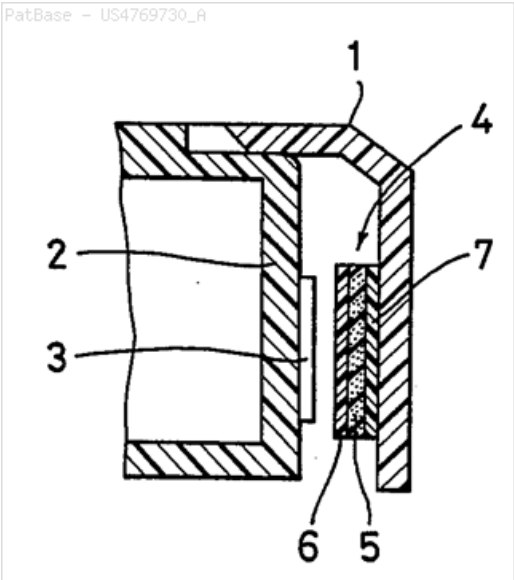
OGASAWARA AKIRA

Title: Magnetic tape cassette with an improved guard panel

Abstract: Source: US4769730A In a magnetic tape cassette of the type having a guard panel disposed at the front opening of the cassette housing to cover the opening when the cassette is in storage and expose it when in use, an electrically conductive tape, consisting of a metal foil supported by a base of plastic film, is affixed with adhesive or by ultrasonic welding or other technique to the inner surface of the guard panel. The metal foil may be located on either side of the base of the conductive tape to face the magnetic tape or the guard panel.

Classifications:

International (IPC 8-9): G11B23/087
G11B23/50 (Advanced/Invention);
G11B23/087 G11B23/50 (Core/Invention)
International (IPC 1-7): G11B23/02 G11B23/087
CPC: G11B23/08735 G11B23/502
European: G11B23/087A4 G11B23/50B
US: 360/132 G9B/23.067 G9B/23.097



Family:

Publication number	Publication date	Application number	Application date
JP61068375 U1	19860510	JP19840153035U	19841012
US4769730 A	19880906	US19850781677	19850930

Priority:

JP19840153035U 19841012

Probable Assignee: TDK A CORP OF JAPANESE CORP
Assignee(s): (std): TDK CORP
Assignee(s): TDK A CORP OF JAPANESE CORP
Inventor(s): (std): SHIBA HARUO ; OKAMURA MASATOSHI

Title: GAS FLOODING PROCESSING FOR THE RECOVERY OF OIL FROM SUBTERRANEAN FORMATIONS

Abstract: Source: US4860828A In a gas flooding or miscible gas flooding operation, the sweep efficiency of the gas is improved using a mixture of an alkylated diphenyl sulfonate and an alpha-olefin sulfonate as the surfactants in a mobility control fluid or diverter.

Classifications:

International (IPC 8-9): C09K8/594 E21B43/16

E21B43/20 (Advanced/Invention);

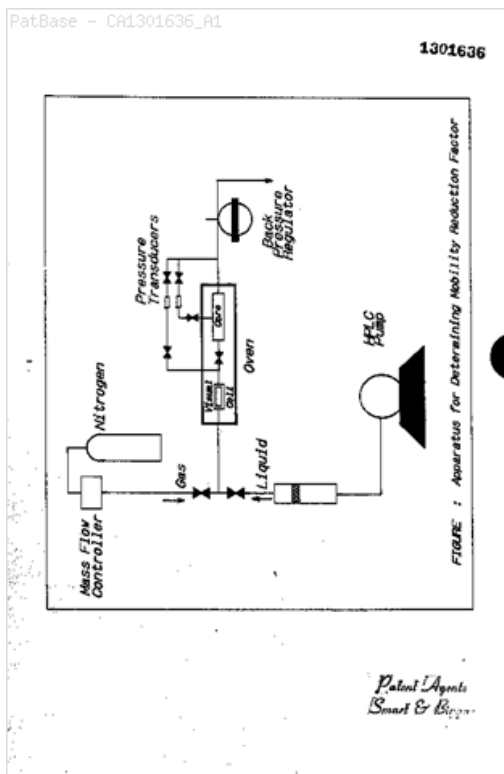
C09K8/58 E21B43/16 (Core/Invention)

International (IPC 1-7): E21B43/20 E21B43/22

CPC: Y10S507/936 C09K8/594 E21B43/168

European: C09K8/594 E21B43/16G2

US: 166/268 166/273 166/274 166/275 166/403 252/8.554 507/202 507/259 507/936



Family:

Publication number	Publication date	Application number	Application date
CA1301636 A1	19920526	CA19890601370	19890531
US4860828 A	19890829	US19880200824	19880601

Priority:

CA19890601370 19890531 US19880200824 19880601

Probable Assignee: DOW CHEMICAL CO

Assignee(s): (std): DOW CHEMICAL CO

Assignee(s): DOW CHEMICAL CO A CORP OF DE ; DOW CHEMICAL CO THE ; DOW CHEMICAL COMPANY THE ; THE DOW CHEMICAL COMPANY ; OSWALD THOMAS ; ROBSON IAN A

Inventor(s): (std): OSWALD THOMAS ; ROBSON IAN A

Agent(s): SMART AND BIGGAR

Title: RESERVOIR-TAILORED CO₂-AIDED OIL RECOVERY PROCESS

Abstract: Source: US4380266A An oil recovery process that utilizes an injection of CO₂, surfactant and water is improved by using a selected polyalkoxylated alcoholic or phenolic surfactant which is capable of forming three particular types of dispersions with the fluids in the reservoir at the reservoir conditions which are maintained during the process.

Classifications:

International (IPC 8-9): C09K8/594 E21B43/16

E21B43/22 (Advanced/Invention);

C09K8/58 E21B43/16 (Core/Invention)

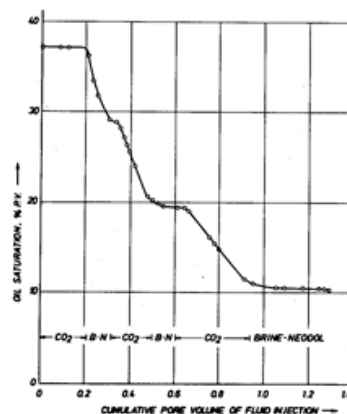
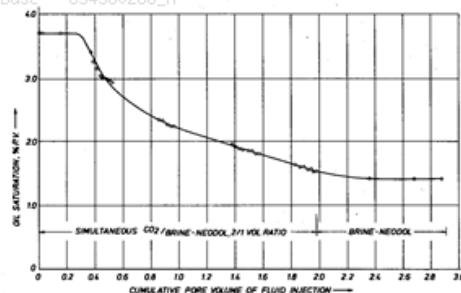
International (IPC 1-7): B01F17/42 E21B43/22 E21B43/25
E21B47/06

CPC: Y02P90/70 C09K8/594 E21B43/164

European: C09K8/594 E21B43/16E

US: 166/252 166/273 166/274 166/403

PatBase - US4380266_R



Family:

Publication number	Publication date	Application number	Application date
CA1174965 A1	19840925	CA19820394473	19820119
DE3208662 A1	19820923	DE19823208662	19820310
FR2501779 A1	19820917	FR19820004026	19820310
FR2501779 B1	19840907	FR19820004026	19820310
GB2094863 A1	19820922	GB19820006856	19820309
GB2094863 B2	19840830	GB19820006856	19820309
US4380266 A	19830419	US19810243164	19810312

Priority:

CA19820394473 19820119 US19810243164 19810312

Probable Assignee: SHELL OIL CO A DE CORP

Assignee(s): (std): SHELL CANADA LTD ; SHELL INT RESEARCH ; SHELL OIL CO

Assignee(s): SHELL OIL COMPANY ; SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ BV ; SHELL OIL CO A DE CORP ; WELLINGTON SCOTT L ; SHELL INT RESEARCH MAA ; SHELL INT RESEARCH MIJ BV ; SHELL INTERNATIONAL RESEARCH MAA ; SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B V ; SHELL CANADA LIMITED

Inventor(s): (std): WELLINGTON SCOTT L ; WELLINGTON SCOTT LEE

Inventor(s): LEE WELLINGTON SCOTT ; SCOTT LEE WELLINGTON

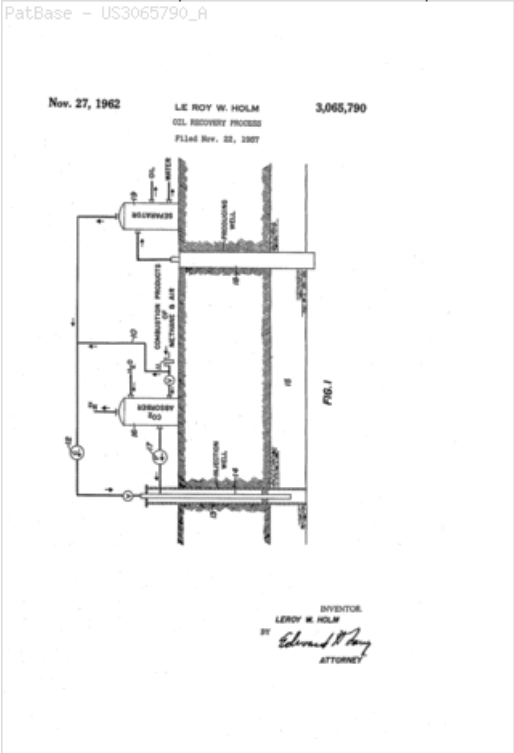
Agent(s): SMART AND BIGGAR

Title: OIL RECOVERY PROCESS

Abstract: Source: US3065790A (Claim 1) 1. A process for producing a petroleum oil from an oil-bearing, vuggy limestone rock reservoir traversed by an injection well and a producing well which comprises injecting into said reservoir through said injection well 500 to 3500 S-C-f- Of CO2 per barrel of said oil in place, to provide an elev-at-ea_ir_ssure not less than about 700 p.s.i. in said reservoir, through said injection well; maintaining the reservoir at the elevated pressure; injecting an aqueous drive fluid into said reservoir through said injection well at said elevated pressure until breakthrough of said drive fluid occurs at said producing well; and then shutting in said injection weR and producing petroleum oil from said producing well at a rate sufficient to reduce the pressure in said reservoir to a pressure substantially lower than said elevated pressure.

Classifications:

International (IPC 8-9): E21B43/16 (Advanced/Invention);
E21B43/16 (Core/Invention)
International (IPC 1-7): E21B43/22
CPC: E21B43/164 Y02P90/70
European: E21B43/16E
US: 166/402



Family:

Publication number	Publication date	Application number	Application date
US3065790 A	19621127	US19570698217	19571122

Priority:

US19570698217 19571122

Probable Assignee:

PURE OIL CO

Assignee(s): (std):

PURE OIL CO

Assignee(s):

THE PURE OIL COMPANY

Inventor(s): (std):

HOLM LE ROY W

Title: METHOD FOR PRODUCING OIL BY MEANS OF CARBON DIOXIDE

Abstract: Source: US2623596A (Claim 1) 1. A method for recovering oil from a subterranean oil reservoir in communication with which are an injection well and a producing well, which comprises gas sweeping said reservoir by injecting thereinto through the injection well, in an amount substantially less than one, but more than 0.11 hydrocarbon pore volume, a single slug of gas comprising carbon dioxide, thereafter injecting through the injection well into the reservoir inert fluid to cause the slug of gas to pass through the reservoir in contact with the oil contained therein, simultaneously with the injecting steps maintaining the pressure on the reservoir in the range from 1,000 p. s. i. to 4,000 p. s. i., and removing to the earth's surface through the producing well oil swept from the reservoir.

Classifications:

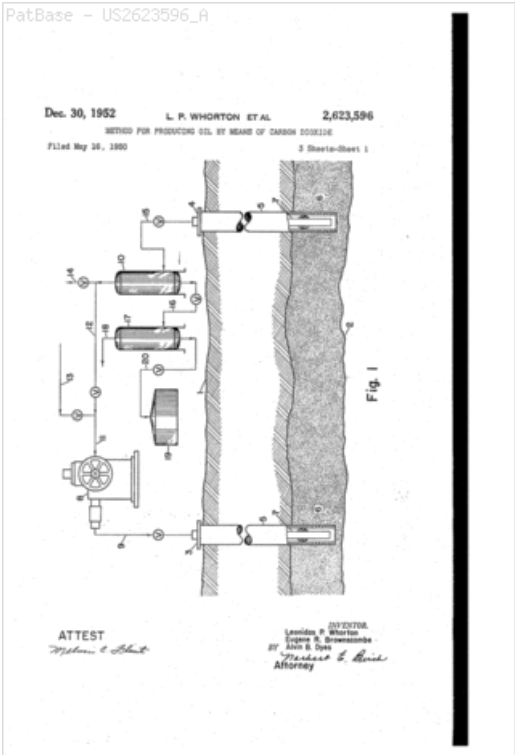
International (IPC 8-9): E21B43/16 E21B43/18 (Advanced/Invention); E21B43/16 (Core/Invention)

International (IPC 1-7): E21B43/20

CPC: E21B43/164 E21B43/18 Y02P90/70

European: E21B43/16E E21B43/18

US: 166/266 166/402



Family:

Publication number	Publication date	Application number	Application date
US2623596 A	19521230	US19500162332	19500516

Priority:

US19500162332 19500516

Probable Assignee: ATLANTIC REFINING CO

Assignee(s): (std): ATLANTIC REFINING CO

Assignee(s): THE ATLANTIC REFINING COMPANY

Inventor(s): (std): BROWNSCOMBE EUGENE R ; DYES ALVIN B ; WHORTON LEONIDAS P

Title: GAS LIFT METHOD WITH SURFACTANT INJECTION

Abstract: Source: US2004177968A Disclosed is a method for optimizing gas lift operations in the production of crude oil. A surfactant is injected with the lift gas into the an oil well such that the surface tension between the lift gas and the formation fluid being produced is reduced and/or a lift gas-formation fluid foam is formed. The reduction in surface tension and/or foam formation increases the efficiency of the lift gas for lifting the formation fluid to the surface. The surfactant is selected to minimize corrosion. Exemplary surfactants include those in the group consisting of ethoxylated alcohols and all salts thereof, ethoxylated alkyl phenols and all salts thereof, ethoxylated amines and all salts thereof, alkyl ether sulfates and all salts thereof, all betaines and all salts thereof, all sultaines and all salts thereof, perfluorinated polyurethanes, and mixtures thereof.

Classifications:

International (IPC 8-9): C09K8/584 C09K8/594 C09K8/94 E21B43/00 E21B43/12 E21B43/22 F04F1/08 (Advanced/Invention); C09K8/58 C09K8/60 E21B43/00 E21B43/12 F04F1/00 (Core/Invention)

International (IPC 1-7): E21B43/00 E21B43/12 E21B43/22

CPC: C09K8/584 C09K8/594 E21B43/122

European: C09K8/584 C09K8/594 E21B43/12B2

US: 166/309 166/372 417/55 507/202 507/244 507/247 507/254

Family:

Publication number	Publication date	Application number	Application date
BRPI0205346 A	20050201	BR2002PI05346	20020515
BRPI0205346 B1	20101103	BR2002PI05346	20020515
CA2446628 AA	20031107	CA20022446628	20020515
CA2446628 C	20091215	CA20022446628	20020515
US2004177968 AA	20040916	US20030477241	20031110
US2007246222 AA	20071025	US20070761227	20070611
US7624804 BB	20091201	US20070761227	20070611
WO02092963 A1	20021121	WO2002US15531	20020515
WO02092963 A2	20021121	WO2002US15531	20020515
WO02092963 A3	20031023	WO2002US15531	20020515
WO02092963 C1	20021227	WO2002US15531	20020515

Priority:

US20010291160P 20010515 US20030477241 20031110 WO2002US15531 20020515
US20070761227 20070611

Probable Assignee: BAKER HUGHES INC

Assignee(s): (std): BAKER HUGHES INC ; RAMACHANDRAN SUNDER

Inventor(s): (std): RAMACHANDRAN SUNDER

Inventor(s): SUNDER RAMACHANDRAN

Agent(s): SIM AND MCBURNEY; MADAN MOSSMAN AND SRIRAM PC; MOSSMAN KUMAR AND TYLER PC

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NE NL NO NZ OM PH PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM ZW

Title: METHOD FOR ENHANCING THE RECOVERY OF PETROLEUM FROM AN OIL-BEARING FORMATION USING A MIXTURE INCLUDING ANIONIC AND CATIONIC SURFACTANTS

Abstract: Source: US5246072A A foam-forming composition comprising a mixture of at least one anionic surfactant and at least one cationic surfactant can effectively form a foam in a variety of formations including an oil-wet environment. In particular, this composition can be employed in a method which comprises at least periodically injecting a gas and this foam-forming composition into an oil-bearing formation to drive oil to a production well. In this composition, the ratio of the at least one anionic surfactant to the at least one cationic surfactant is selected so that the surfactants do not form substantial amounts of precipitate when mixed together. In certain environments, e.g., when the formation contains upwards of 20 percent total dissolved solids and/or a divalent metal ion concentration up to about 20,000 ppm, the composition can further contain at least one salt-tolerance additive, e.g., a nonionic surfactant.

Classifications:

International (IPC 8-9): C09K8/594 C09K8/94 E21B43/22 (Advanced/Invention);

C09K8/58 C09K8/60 (Core/Invention)

International (IPC 1-7): E21B43/22

CPC: Y10S507/936 C09K8/94 C09K8/594

European: C09K8/594 C09K8/94

US: 166/268 166/270.1 166/273 166/305.1 166/309 252/8.554 507/202 507/240 507/252 507/254 507/255 507/259 507/936

Family:

Publication number	Publication date	Application number	Application date
CA2110918 AA	19931207	CA19922110918	19920814
GB2274128 A1	19940713	GB19930025254	19920814
GB2274128 B2	19950628	GB19930025254	19920814
GB9325254 A0	19940309	GB19930025254	19920814
NO934587 A	19940201	NO19930004587	19931213
NO934587 A0	19931213	NO19930004587	19931213
US5246072 A	19930921	US19910744895	19910814
WO9304265 A1	19930304	WO1992US06623	19920814

Priority:

US19910744895 19910814 WO1992US06623 19920814

Probable Assignee: CHEVRON RES AND TECH

Assignee(s): (std): CHEVRON RES AND TECH

Assignee(s): CHEVRON RESEARCH AND TECHNOLOGY CO ; CHEVRON RESEARCH AND TECHNOLOGY COMPANY ; CHEVRON RESEARCH AND TECHNOLOGY CORP ; FRAZIER RAWLS H JR ; HORNE WILLIE JR ; KUEHNE DONALD L ; CANTOR JEREMY

Inventor(s): (std): FRAZIER JR RAWLS H ; HORN JR WILLIE ; HORN WILLIE JR ; KUEHNE DONALD L ; CANTOR JEREMY ; KUEHNE DONLD L ; HORNE WILLIE JR ; FRAZIER RAWLS H JR ; FRAZIER RAWLS H

Inventor(s): DONALD L KUEHNE ; JEREMY CANTOR ; RAWLS H FRAZIER JR ; WILLIE HORN JR

Agent(s): SIM AND MCBURNEY

Designated states: CA DE GB NO

Title: GAS FLOODING WITH DILUTE SURFACTANT SOLUTIONS

Abstract: Source: US4856589A A gas flooding process for displacing oil within a reservoir is improved by injections of a surfactant having a composition and concentration correlated with those of the brine used to remain substantially within the water phase of the injected fluid at a concentration below the critical micelle concentration of the surfactant.

Classifications:

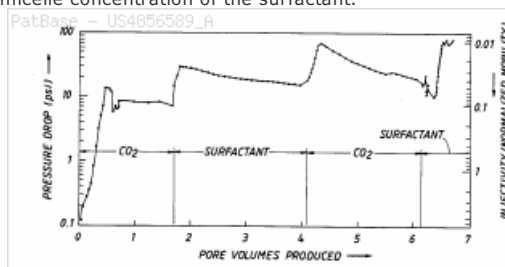
International (ipc 8-9): C09K8/584 E21B43/16 (Advanced/Invention); C09K8/58 E21B43/16 (Core/Invention)

International (ipc 1-7): E21B43/22

CPC: Y10S507/938 C09K8/584 E21B43/164

European: C09K8/584 E21B43/16E

US: 166/268 166/273 166/274 166/309 166/403 252/8.554 507/254 507/255 507/938



Family:

Publication number	Publication date	Application number	Application date
US4856589 A	19890815	US19880238634	19880830

Priority:

US19880238634 19880830

Probable Assignee: SHELL OIL CO

Assignee(s): (std): SHELL OIL CO

Assignee(s): SHELL OIL CO A CORP OF DE ; SHELL OIL COMPANY

Inventor(s): (std): KUHLMAN MYRON I ; FALLS ANDREW H ; BORCHARDT JOHN K

Title: METHOD OF ENHANCING RECOVERY OF PETROLEUM FROM AN OIL-BEARING FORMATION

Abstract: Source: US5076357A A method for enhancing the recovery of petroleum from an oil bearing formation during injection of a non-condensable gas comprises the at least periodic injection of a foam forming composition or a preformed foam into the reservoir. The foam comprises a mixture of a non-condensable gas, preferably CO₂, water and an alpha-olefin sulfonate. The alpha-olefin sulfonate comprises a mixture of hydroxy-sulfonates and alkene-sulfonates wherein the ratio of alkene-sulfonates to hydroxy-sulfonates is preferably not greater than about 4. In addition, the hydroxy-sulfonates comprises 3-hydroxy and 4-hydroxy-sulfonates wherein the ratio of 3-hydroxy-sulfonates to 4-hydroxy-sulfonates is at least about 2. The method is preferably employed within a light oil bearing formation comprising sandstone.

Classifications:

International (IPC 8-9): C09K8/594 C09K8/94 E21B43/16

E21B43/22 (Advanced/Invention);

C09K8/58 C09K8/60 E21B43/16 (Core/Invention)

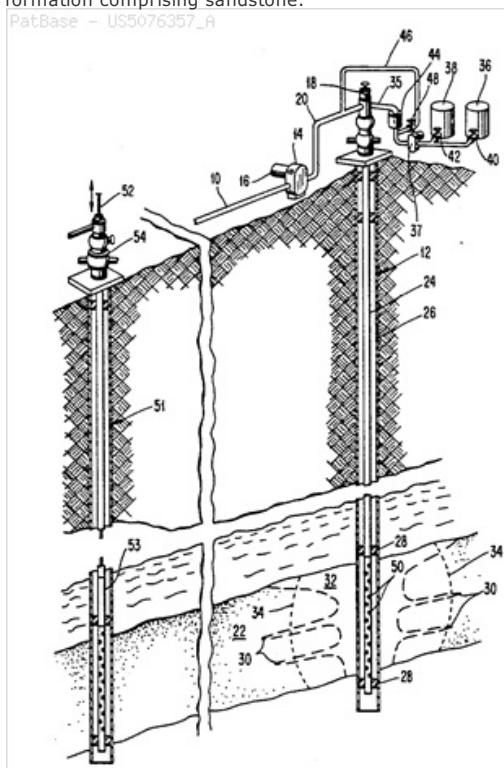
International (IPC 1-7): E21B43/22

CPC: Y10S507/936 C09K8/94 C09K8/594 E21B43/164 E21B43/168

European: C09K8/594 C09K8/94 E21B43/16E E21B43/16G2

US: 166/268 166/273 166/275 166/309 166/403 252/8.554 507/202 507/259 507/936

PatBase - US5076357_R



Family:

Publication number	Publication date	Application number	Application date
CA2043382 AA	19911201	CA19912043382	19910528
US5076357 A	19911231	US19900531051	19900531

Priority:

CA19912043382 19910528 US19900531051 19900531

Probable Assignee: CHEVRON RES AND TECH

Assignee(s): (std): CHEVRON RES AND TECH

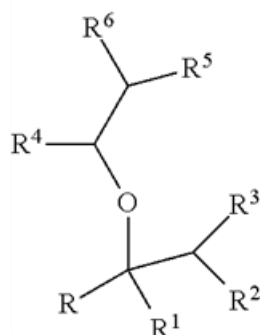
Assignee(s): CHEVRON RESEARCH AND TECHNOLOGY CO ; CHEVRON RESEARCH AND TECHNOLOGY CO SAN FRANCISCO C ; CHEVRON RESEARCH AND TECHNOLOGY CO SAN FRANCISCO CA A CORP OF DE ; CHEVRON RESEARCH AND TECHNOLOGY COMPANY ; MARQUIS DAVID M

Inventor(s): (std): MARQUIS DAVID M

Agent(s): SIM AND MCBURNEY

Title: SULFONATE SURFACTANTS AND METHODS OF PREPARATION AND USE

Abstract: Source: US2011015111A Provided are new anionic surfactants and methods of their preparation and use. The surfactants are compounds of the formula I:



and R⁶ are as defined herein.

Classifications:

International (IPC 8-9): A61K8/46 C07C303/02 C07C303/32 C07C309/10 C08F2/24 C08F2/26 C09K8/035 C09K8/584 C11D1/12 C11D1/14 C11D1/37 C11D1/65 C11D1/83 C11D1/94 C11D17/00 C11D3/386 C11D3/395 C11D3/40 C11D3/43 C11D3/50 (Advanced/Invention)

CPC: C07C309/10 C08F2/26 C09K8/035 C09K8/584 C11D1/143

European: C07C309/10 C08F2/26 C09K8/035 C09K8/584 C11D1/14B

US: 510/351 510/428 510/429 510/492 562/101 562/101S 562/110 562/110S

(I)

wherein R, R¹, R², R³, R⁴, R⁵,

PatBase - US2011015111_AA

Patent Application Publication Jan. 20, 2011 Sheet 1 of 5 US 2011/0015111 A1

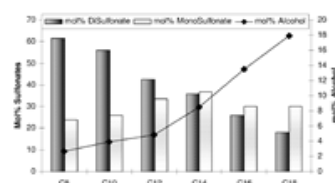


Fig. 1

Family:

Publication number	Publication date	Application number	Application date
CN102471249 A	20120523	CN201080031450	20100630
CN102471249 B	20140730	CN201080031450	20100630
DE602010022543 D1	20150409	DE201060022543T	20100630
EP2454233 A2	20120523	EP20100729043	20100630
EP2454233 B1	20150225	EP20100729043	20100630
JP2012533543 T2	20121227	JP20120520657T	20100630
JP5731497 B2	20150610	JP20120520657T	20100630
US2011015111 AA	20110120	US20100827165	20100630
US8304377 BB	20121106	US20100827165	20100630
WO11008570 A2	20110120	WO2010US40570	20100630
WO11008570 A3	20110609	WO2010US40570	20100630

Priority:

EP20100729043 20100630 US20090226109P 20090716 US20100827165 20100630
WO2010US40570 20100630

Probable Assignee: DOW CHEMICAL CO

Assignee(s): (std): GRAF IRINA V ; RAND CYNTHIA L ; PHILLIPSON KARI S ; YU WAGLIN ; DOW GLOBAL TECHNOLOGIES INC ; DOW GLOBAL TECHNOLOGIES LLC ; RAND CYNTHIA ; ARGENTON ANDRE B ; CHENG YANG ; DAUGS EDWARD D

Assignee(s): DCOMCO INC ; DOW CHEMICAL CO ; DOW GLOBAL TECHNOLOGIES INC MIDLAND

Inventor(s): (std): ARGENTON ANDRE B ; CHENG YANG ; DAUGS EDWARD D ; GRAF IRINA V ; PHILLIPSON KARI S ; RAND CYNTHIA ; RAND CYNTHIA L ; WAGLIN YU ; YANG CHENG ; YU WAGLIN

Agent(s): MURGITROYD AND CO; RAYNOR JOHN; BECK GREENER; THE DOW CHEMICAL COMPANY; DOW CHEMICAL CO; SHALTOUT RAE L M

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: PROCESS FOR REDUCING INORGANICS FROM AND CONCENTRATING ANIONIC SURFACTANT SOLUTIONS

Abstract: Source: US2012078008A A process including contacting one or more Strecker sulfonation reaction products of one or more halogenated alkyl ethers in the presence of sulfite with one or more polar water soluble organic solvents selected from acetone, methyl ethyl ketone, the C2-C5 alkyl alcohols, and the like, to form an extraction mixture; allowing the extraction mixture to separate into an aqueous phase and an organic phase; and separating the aqueous phase from the organic phase; wherein the one or more Strecker sulfonation reaction products each comprise at least 30 percent by weight of one or more inorganic salts and the organic phase following separation comprises less than 20 percent by weight of one or more inorganic salts, is provided.

Classifications:

International (IPC 8-9): C07C303/44

C07C309/00 (Advanced/Invention)

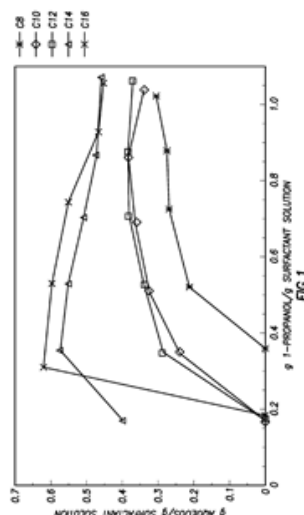
CPC: C07C303/44 C07C309/10

European: C07C303/44

US: 562/101 562/101P

PatBase - US2012078008_AA

Patent Application Publication Mar. 29, 2012 Sheet 1 of 5 US 2012/078008 A1



Family:

Publication number	Publication date	Application number	Application date
US2012078008 AA	20120329	US20110242963	20110923
US8987506 BB	20150324	US20110242963	20110923

Priority:

US20100386726P 20100927 US20110242963 20110923

Probable Assignee: DOW GLOBAL TECHNOLOGIES LLC

Assignee(s): (std): DAUGS EDWARD D ; DOW GLOBAL TECHNOLOGIES LLC

Assignee(s): DOW GLOBAL TECHNOLOGIES INC

Inventor(s): (std): DAUGS EDWARD D

Title: TEMPERATURE-RESISTANT SALT-TOLERANT FOAMING AGENT CARBON DIOXIDE FLOODING PROFILE CONTROL AND PREPARATION METHOD THEREOF

Abstract: Source: CN102660251A The invention belongs to the technical field of the chemicals in an oil field, which discloses a temperature-resistant salt-tolerant foaming agent carbon dioxide flooding profile control and a preparation method thereof. The foaming agent comprises 15-30 percent of anion-nonionic surfactant host, 6-20 percent of nonionic assistant foaming agent, 2-5 percent of organic micromolecule foam stabilizing agent and 50-77 percent of water. The preparation method for the temperature-resistant salt-tolerant foaming agent carbon dioxide flooding profile control comprises the following steps of: adding the anion-nonionic surfactant host and water into a reaction kettle in sequence; heating to 40-60DEG C, stirring and dissolving; then adding the nonionic assistant foaming agent; after the nonionic assistant foaming agent is dissolved, continuing to add the foam stabilizing agent to stir; and evenly dissolving to obtain the product. The foaming agent disclosed by the invention is suitable for the carbon dioxide flooding plugged channeling profile control under the geological conditions that temperature is not higher than 110DEG C, and the degree of mineralization is not higher than 150000ppm.

Classifications:

International (IPC 8-9): C09K8/594 (Advanced/Invention)

Family:

Publication number	Publication date	Application number	Application date
CN102660251 A	20120912	CN201210123413	20120425

Priority:

CN201210123413 20120425

Probable Assignee: CHINA PETROLEUM AND CHEMICAL

Assignee(s): (std): CHINA PETROLEUM AND CHEMICAL ; CHINA PETROLEUM AND CHEMICAL CORP ; NANJING CHEM IND CO RES INST

Assignee(s): RESEARCH INST OF NANJING CHEMICAL IND GROUP

Inventor(s): (std): JUNXIU YUAN ; KANG WANG ; KUI ZHU ; DONG HUANG ; DONGMEI XU ; GANG JIN ; GUIGUANG LU ; ZHIZHONG YANG

Inventor(s): ZHU KUI ; HUANG DONG ; JIN GANG ; LU GUIGUANG ; WANG KANG ; XU DONGMEI ; YANG ZHIZHONG ; YUAN JUNXIU

Title: ENHANCED OIL RECOVERY METHOD EMPLOYING A HIGH TEMPERATURE BRINE TOLERANT FOAM-FORMING COMPOSITION

Abstract: Source: US5358045A An enhanced oil recovery technique for recovering hydrocarbons from a reservoir during gas injection comprises the at least periodic injection of gas and a foam-forming composition into the reservoir. The foam-forming composition comprises water, an effective foam-forming amount of a C10-16 alpha -olefin sulfonate surfactant including C10 AOS and/or C12 AOS, and an effective amount of at least one solubilizing component to increase the brine tolerance of the composition. This solubilizing component is a mixture comprising and where M is H, an alkali metal, alkaline earth metal, or ammonium, where R1 is a linear C6-C16 alkyl group. The method further comprises contacting the hydrocarbons in the reservoir with the foam so as to assist in the recovery of hydrocarbons from the reservoir.

Classifications:

International (IPC 8-9): C09K8/584 C09K8/594

E21B43/22 (Advanced/Invention);

C09K8/58 (Core/Invention)

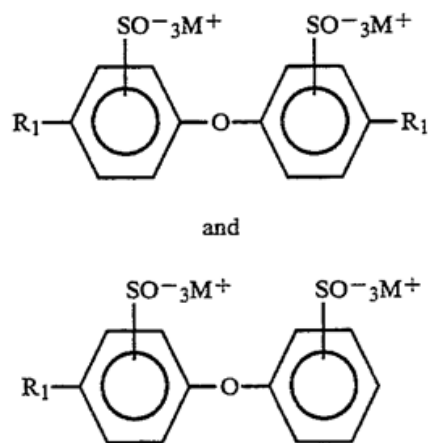
International (IPC 1-7): E21B43/22

CPC: Y10S507/935 C09K8/584 C09K8/594

European: C09K8/584 C09K8/594

US: 166/270.1 166/273 166/274 166/309 252/8.554 507/202 507/935

PatBase - US5358045_A



Family:

Publication number	Publication date	Application number	Application date
AU199461753 A1	19940829	AU19940061753	19940214
US5358045 A	19941025	US19930017294	19930212
WO9418431 A1	19940818	WO1994US01621	19940214

Priority:

US19930017294 19930212 WO1994US01621 19940214

Probable Assignee: CHEVRON RESEARCH AND TECHNOLOGY CO

Assignee(s): (std): CHEVRON RES AND TECH

Assignee(s): CHEVRON RESEARCH AND TECHNOLOGY CO ; CHEVRON RESEARCH AND TECHNOLOGY CO A DIVISION OF CHEVRON USA INC ; CHEVRON RESEARCH AND TECHNOLOGY COMPANY ; CHEVRON RESEARCH AND TECHNOLOGY COMPANY A DIVISION ; CHEVRON RESEARCH AND TECHNOLOGY COMPANY A DIVISION OF CHEVRON U S A INC

Inventor(s): (std): CANTOR JEREMY ; KUEHNE DONALD L ; SEVIGNY WILLARD J

Inventor(s): WILLARD J SEVIGNY ; DONALD L KUEHNE ; JEREMY CANTOR

Designated states: AT AU BB BE BF BG BJ BR BY CA CF CG CH CI CM CN CZ DE DK ES FI FR GA GB GN GR HU IE IT JP KP KR KZ LK LU LV MC MG ML MN MR MW NE NL NO NZ PL PT RO RU SD SE SK SN TD TG UA UZ VN

Title: FOAM DRIVE OIL RECOVERY PROCESS**Abstract:** Source: US3529668A ABSTRACT OF THE DISCLOSURE

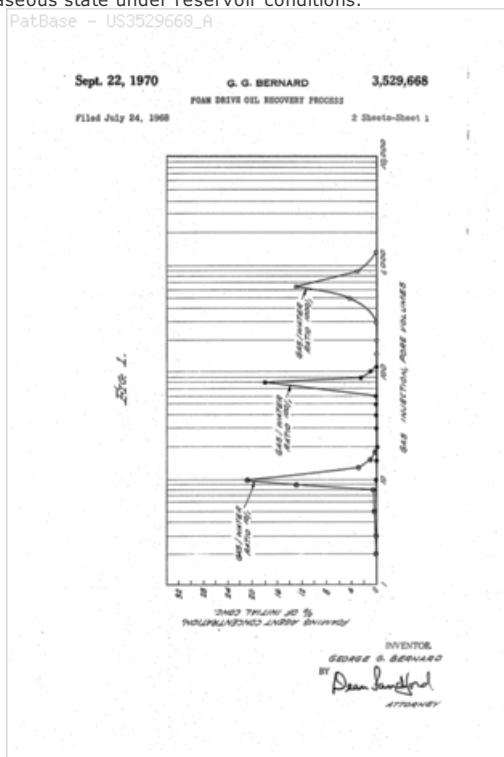
A process for recovering oil from porous subterranean reservoirs in which a bank of foam is established in the reservoir and displaced through the reservoir toward a spaced production well by the injection of a combination 15 of gaseous and aqueous liquid drive fluids injected in the proportion of about 5 to 15 volumes of gas per volume of aqueous liquid as measured at reservoir conditions of temperature and pressure. Oil and other produced fluids are recovered from the production well. The drive fluid 20 can be injected in the form of successive alternate slugs of gas and liquid, or the gas and aqueous liquid can be simul-taneously injected into the reservoir. The gas remains in the gaseous state under reservoir conditions.

Classifications:**International (IPC 8-9):** C09K8/594 E21B43/16 E21B43/20 (Advanced/Invention);

C09K8/58 E21B43/16 (Core/Invention)

International (IPC 1-7): E21B43/20 E21B43/22**CPC:** C09K8/594 E21B43/16 E21B43/20**European:** C09K8/594 E21B43/16 E21B43/20**US:** 166/273 166/275 166/403

PatBase - US3529668_A

**Family:**

Publication number	Publication date	Application number	Application date
US3529668 A	19700922	US19680747240	19680724

Priority:

US19680747240 19680724

Probable Assignee:

UNION OIL CO

Assignee(s): (std):

UNION OIL CO

Assignee(s):

UNION OIL CO OF CALIFORNIA

Inventor(s): (std):

BERNARD GEORGE G

Inventor(s):

GEORGE G BERNARD