



- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>(51) International Patent Classification:</b><br/> <i>C10G 27/02</i> (2006.01)      <i>C25B 1/00</i> (2006.01)<br/> <i>C10G 19/08</i> (2006.01)</p> <p><b>(21) International Application Number:</b><br/> PCT/US2011/057722</p> <p><b>(22) International Filing Date:</b><br/> 25 October 2011 (25.10.2011)</p> <p><b>(25) Filing Language:</b> English</p> <p><b>(26) Publication Language:</b> English</p> <p><b>(30) Priority Data:</b><br/> 12/914,275      28 October 2010 (28.10.2010)      US</p> <p><b>(71) Applicant</b> (<i>for all designated States except US</i>): <b>CHEVRON U.S.A. INC.</b> [US/US]; 6001 Bollinger Canyon Road, San Ramon, California 94583 (US).</p> | <p><b>(72) Inventors; and</b><br/> <b>(75) Inventors/Applicants</b> (<i>for US only</i>): <b>LI, Lin</b> [CN/US]; 6001 Bollinger Canyon Road, San Ramon, California 94583 (US). <b>HE, Zunqing</b> [US/US]; 6001 Bollinger Canyon Road, San Ramon, California 91583 (US). <b>ZHOU, Zhen</b> [CN/US]; 6001 Bollinger Canyon Road, San Ramon, California 94583 (US). <b>NG, King T.</b> [US/US]; 6001 Bollinger Canyon Road, San Ramon, California 91583 (US). <b>HAJDU, Paul E.</b> [US/US]; 6001 Bollinger Canyon Road, San Ramon, California 94583 (US).</p> <p><b>(74) Agents:</b> <b>PHAM, Hanh T.</b> et al.; Chevron Corporation, Law Department, Post Office Box 6006, San Ramon, California 94583-0806 (US).</p> <p><b>(81) Designated States</b> (<i>unless otherwise indicated, for every kind of national protection available</i>): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.</p> <p><b>(84) Designated States</b> (<i>unless otherwise indicated, for every kind of regional protection available</i>): ARIPO (BW, GH,</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

*[Continued on next page]*

- (54) Title:** METHOD FOR REDUCING MERCAPTANS IN HYDROCARBONS

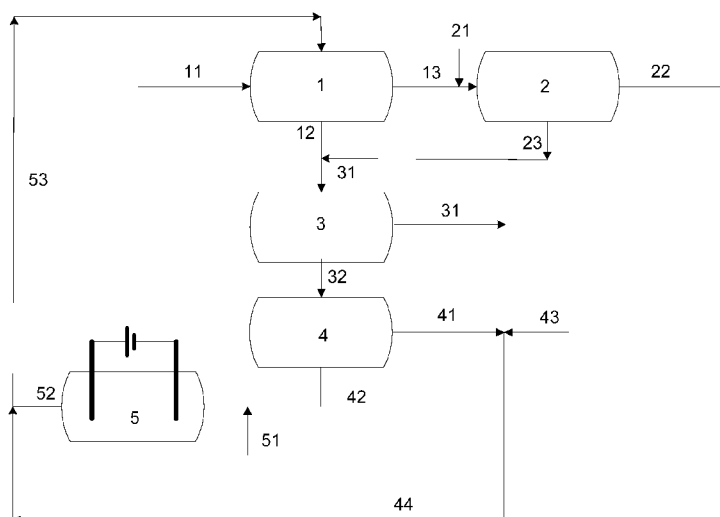


FIG. 1

- (57) Abstract:** A method for reducing mercaptan concentration in a crude oil is disclosed. The method comprises contacting the crude with a treating solution comprising a hypochlorite solution, whereby the mercaptan sulfur is oxidized and converted to at least one sulfur oxoacid or salt thereof, yielding a treated crude oil having less than 50 ppm mercaptan sulfur and residual chloride. The treated crude oil containing residual chloride is brought in contact with a caustic solution at a molar ratio of caustic to chloride of 0.05:1 to 1:1, generating an upgraded crude oil with less than 50 ppm chloride. In one embodiment, the spent treating solution is recycled to form a regenerated hypochlorite stream for use in the treatment solution.



GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

**Published:**

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

**(88) Date of publication of the international search report:**

16 August 2012