



- (51) **International Patent Classification:**  
*G01N 21/75* (2006.01) *G01N 21/31* (2006.01)
- (21) **International Application Number:**  
PCT/US2011/062529
- (22) **International Filing Date:**  
30 November 2011 (30.11.2011)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**  
12/957,854 1 December 2010 (01.12.2010) US
- (71) **Applicant (for all designated States except US):** **NALCO COMPANY** [US/US]; 1601 W. Diehl Road, Naperville, Illinois 60563-1198 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **BANKS, Rodney H.** [US/US]; 1504 Greenlake Drive, Aurora, Illinois 60502 (US). **CIOTA, Steven R.** [US/US]; 6801 Springside Avenue, Downers Grove, Illinois 60516 (US). **WELZ, Sascha** [US/US]; 1040 W. Adams Street #249, Chicago, Illinois 60607 (US).
- (74) **Agents:** **CARLSEN, Benjamin E.** et al.; 1601 W. Diehl Road, Naperville, Illinois 60563-1198 (US).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** 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.

- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, 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))
- of inventorship (Rule 4.17(iv))

**Published:**

- with international search report (Art. 21(3))

[Continued on next page]

- (54) **Title:** METHOD AND APPARATUS FOR DETERMINATION OF SYSTEM PARAMETERS FOR REDUCING CRUDE UNIT CORROSION

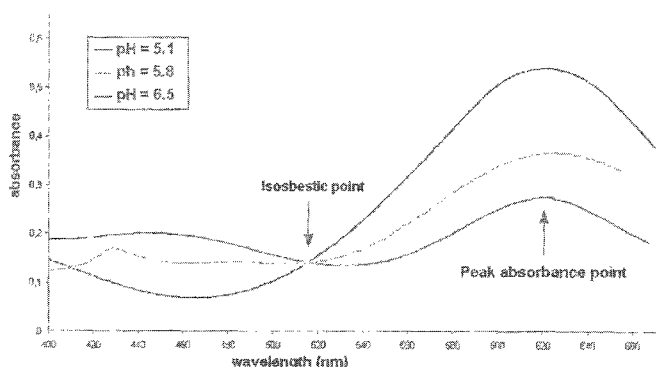


FIGURE 1

(57) **Abstract:** The invention provides a method and apparatus for determining the amount of various materials in a liquid sample. Because the apparatus is particularly resilient it can be used repeatedly with very harsh liquid samples such as boot water from an oil refinery. The apparatus uses at least one volume and/or concentration independent optical analysis method to determine at least one of: the pH, amount of chloride, and/or amount of iron in the sample. The optical property can be colorimetric, fluorescent or both and result from adding dyes, complexing agents, turbidity inducing compounds, and other optically effecting reagents to the sample. Because the measurements are concentration and volume independent they can be done continuously, quickly, and avoid the inconvenient start and stop procedures in prior art measurement regimens. The method further includes using a BDD cell to oxidize materials (such as sulfoxo compounds) that would otherwise interfere with the optical analysis and/or to sparge the sample with gas.



— *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:**  
4 October 2012