



(51) International Patent Classification:

G01N 21/27 (2006.01) G01J 3/28 (2006.01)
G01N 21/43 (2006.01)

(21) International Application Number:

PCT/US2010/030299

(22) International Filing Date:

7 April 2010 (07.04.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/167,505 7 April 2009 (07.04.2009) US
61/226,677 17 July 2009 (17.07.2009) US

(71) Applicant (for all designated States except US): **RARE LIGHT, INC.** [US/US]; 1209 Orange Street, Wilmington, DE 19801-1120 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **MESSERSCHMIDT, Robert G.** [US/US]; 1169 Autumn Court, Pleasanton, California 94566 (US).(74) Agent: **SCHWEGMAN, LUNDBERG & WOESSNER, P.A.**; P.O. Box 2938, Minneapolis, MN 55402 (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, RO, RS, RU, 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, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (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, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

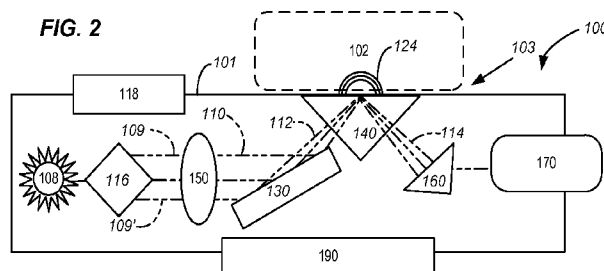
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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

31 March 2011

(54) Title: PERI-CRITICAL REFLECTION SPECTROSCOPY DEVICES, SYSTEMS, AND METHODS

FIG. 2



(57) **Abstract:** Spectroscopy apparatuses oriented to the critical angle of the sample are described that detecting the spectral characteristics of a sample wherein the apparatus consists of an electromagnetic radiation source adapted to excite a sample with electromagnetic radiation introduced to the sample at a location at an angle of incidence at or near a critical angle of the sample; a transmitting crystal in communication with the electromagnetic radiation source and the sample, the transmitting crystal having a high refractive index adapted to reflect the electromagnetic radiation internally; a reflector adapted to introduce the electromagnetic radiation to the sample at or near an angle of incidence near the critical angle between the transmitting crystal and sample; and a detector for detecting the electromagnetic radiation from the sample. Also, provided herein are methods, systems, and kits incorporating the peri-critical reflection spectroscopy apparatus.