

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 August 2008 (14.08.2008)

PCT

(10) International Publication Number
WO 2008/096595 A1

(51) International Patent Classification:
G11B 5/738 (2006.01) *G11B 5/84* (2006.01)

(21) International Application Number:
PCT/JP2008/050841

(22) International Filing Date: 16 January 2008 (16.01.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2007-027095 6 February 2007 (06.02.2007) JP

(71) Applicant (for all designated States except US): **SHOWA DENKO K.K.** [JP/JP]; 13-9, Shiba Daimon 1-chome, Minato-ku, Tokyo 105-8518 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SAKAGUCHI, Ryuji** [JP/JP]; c/o SHOWA DENKO ELECTRONICS K.K., 5-1, Yawata Kaigan dori, Ichihara-shi, Chiba, 290-0067 (JP). **KUROKAWA, Gohei** [JP/JP]; c/o SHOWA DENKO ELECTRONICS K.K., 5-1, Yawata Kaigan dori, Ichihara-shi, Chiba, 290-0067 (JP). **SASAKI, Yuzo** [JP/JP]; c/o SHOWA DENKO ELECTRONICS K.K., 5-1, Yawata Kaigan dori, Ichihara-shi, Chiba, 290-0067 (JP). **KOMATSUDA, Tatsu** [JP/JP]; c/o SHOWA DENKO ELECTRONICS K.K., 5-1, Yawata

Kaigan dori, Ichihara-shi, Chiba, 290-0067 (JP). **SINGH, Amarendra, K.** [IN/IN]; c/o SHOWA DENKO ELECTRONICS K.K., 5-1, Yawata Kaigan dori, Ichihara-shi, Chiba, 290-0067 (JP).

(74) Agents: **FUKUDA, Kenzo** et al.; Kashiwaya Bldg., 6-13, Nishishinbashi 1-chome, Minato-ku, Tokyo 105-0003 (JP).

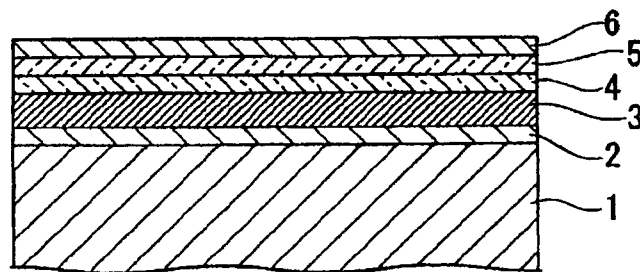
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, KE, KG, KM, KN, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, 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, 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, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

(54) Title: PERPENDICULAR MAGNETIC RECORDING MEDIUM, METHOD OF MANUFACTURING THE MEDIUM AND MAGNETIC RECORDING AND REPRODUCING APPARATUS

FIG.1



second component element is Co or Cr.

(57) Abstract: In a perpendicular magnetic recording medium having at least a soft magnetic back layer, an underlayer, an intermediate layer and a perpendicular magnetic recording layer on a nonmagnetic substrate, at least one layer in the intermediate layer contains Re as a main component element and contains, as a second main component element, an element having an hcp structure or an element having a bcc structure. The concentration of Re as the main component element of the intermediate layer is within the range from 55 to 99.5 atomic percent. The