

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
17 October 2019 (17.10.2019)



(10) International Publication Number
WO 2019/199233 A1

(51) International Patent Classification:

C12Q 1/00 (2006.01) *C08G 85/00* (2006.01)
C12N 11/06 (2006.01) *C08L 5/08* (2006.01)
C12N 11/10 (2006.01) *C08L 79/02* (2006.01)
C08B 37/00 (2006.01)

(21) International Application Number:

PCT/SG2019/050202

(22) International Filing Date:

10 April 2019 (10.04.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

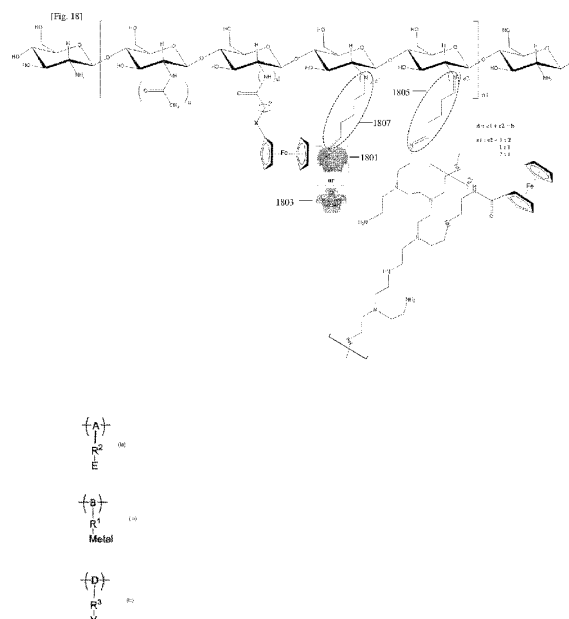
10201802969S 10 April 2018 (10.04.2018) SG

(71) Applicant: **SINGAPORE HEALTH SERVICES PTE LTD** [SG/SG]; 31 Third Hospital Avenue, #03-03, Bowyer Block C, Singapore 168753 (SG).

(72) Inventors: **TAN, Ngian Chye**; Division of Surgical Oncology, level 4, National Cancer Centre Singapore, 11 Hospital Drive, Singapore 169610 (SG). **CHUI, Christopher Hoe Kong**; 5 Martaban Road, Singapore 328636 (SG). **ZHU, Zanzan**; 31A Nanyang Ave, #07-02, Singapore 639804 (SG). **CHEONG, Wai Chye**; Academia, Level 6, Room 32, 20 College Road, Singapore 169856 (SG). **LOKE, Fiona Wei Ling**; Academia, Level 6, Room 32, 20 College Road, Singapore 169856 (SG). **NG, John Shen Him**; Academia, Level 6, Room 32, 20 College Road, Singapore 169856 (SG). **GAN, Lu**; Division of Surgical Oncology, Level 4, National Cancer Centre Singapore, 11 Hospital Drive, Singapore 169610 (SG). **LIEU, Richard Siang-Long**; 109 Pettir Road, #11-22, Foresque Residences, Singapore 678276 (SG).

(74) Agent: **SPRUSON & FERGUSON (ASIA) PTE LTD**; P.O. Box 1531, Robinson Road Post Office, Singapore 903031 (SG).

(54) Title: AN ENZYME CONTAINING POLYMER, A SENSOR CONTAINING THE SAME, A MONITOR AND A MONITORING METHOD



(57) Abstract: The present invention relates to an enzyme-containing polymer of 2-amino monosaccharide, preferably an enzyme-containing chitosan, comprising: a first repeating unit of the following Formula 1a: a second repeating unit of the following Formula 1b: and a third repeating unit of the following Formula 1c: or conjugate salts thereof, wherein all the substituents are as defined herein. There is also provided a redox polymer and the methods of preparing the enzyme-containing polymer and the redox polymer. The present invention also relates to a sensor, a method of manufacturing the sensor, a monitor, methods for monitoring failure of a tissue and uses of the sensor comprising the enzyme-containing polymer, and the monitor thereof.

[Continued on next page]

(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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *with international search report (Art. 21(3))*
 — *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*