

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
21 October 2021 (21.10.2021)



(10) International Publication Number
WO 2021/209818 A1

(51) International Patent Classification:

C12Q 1/32 (2006.01) *G01N 21/64* (2006.01)
C12Q 1/34 (2006.01) *G01N 21/76* (2006.01)
C12Q 1/533 (2006.01) *C12M 1/34* (2006.01)
C12Q 1/26 (2006.01) *C12M 3/06* (2006.01)
C12Q 1/00 (2006.01) *C12M 1/00* (2006.01)

(21) International Application Number:

PCT/IB2021/000255

(22) International Filing Date:

13 April 2021 (13.04.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/008,870 13 April 2020 (13.04.2020) US
63/199,500 04 January 2021 (04.01.2021) US

(71) Applicant: **NATIONAL UNIVERSITY OF SINGAPORE** [SG/SG]; 21 Lower Kent Ridge Road, Singapore 119077 (SG).

(72) Inventors: **LI, Zhi**; c/o National University of Singapore, Faculty of Engineering/Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG).

gapore 119077 (SG). **CHEN, Chia-hung**; c/o National University of Singapore, Faculty of Engineering/Department of Biomedical Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **ZHOU, Kang**; c/o National University of Singapore, Faculty of Engineering/Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **LI, Jun**; c/o National University of Singapore, Faculty of Engineering/Department of Biomedical Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **LIU, Ji**; c/o National University of Singapore, Faculty of Engineering/Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **VAHIDI KHALFEKANDI, Akbar**; c/o National University of Singapore, Faculty of Engineering/Department of Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **SUN, Guoyun**; c/o National University of Singapore, Faculty of Engineering/Department of Biomedical Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **WEN, Yuting**; c/o National University of Singapore, Faculty of Engineering/Department of Biomedical Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG). **TIAN, Kaiyuan**; c/o National University of Singapore, Faculty of Engineering/Department of

(54) Title: ULTRA-HIGH-THROUGHPUT MICROFLUIDIC ENZYME SCREENING PLATFORM FOR ENZYME DEVELOPMENT

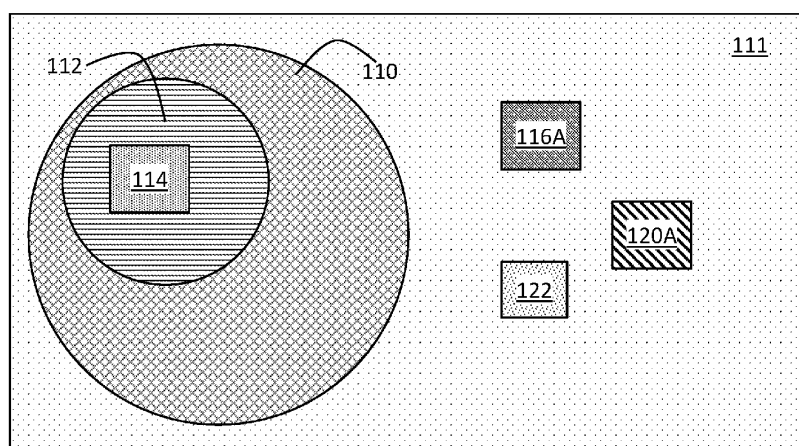


FIG. 1A

(57) Abstract: Systems and methods for screening enzyme variants are described, wherein the enzyme variants may catalyze a reaction that is cofactor -dependent or cofactor -independent.

[Continued on next page]

WO 2021/209818 A1

Chemical and Biomolecular Engineering, 21 Lower Kent Ridge Road, Singapore 119077 (SG).

(74) **Agent: LOW, Pei Lin;** Allen & Gledhill LLP, One Marina Boulevard, #28-00, Singapore 018989 (SG).

(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, IT, 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, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, 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).

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))