

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
29 June 2023 (29.06.2023)



(10) International Publication Number
WO 2023/121567 A3

(51) International Patent Classification:

G01N 33/50 (2006.01) C08F 220/58 (2006.01)
C12Q 1/28 (2006.01) C08F 2/10 (2006.01)
C08F 220/56 (2006.01) C08J 3/24 (2006.01)

(21) International Application Number:

PCT/SG2022/050922

(22) International Filing Date:

21 December 2022 (21.12.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10202114186S 21 December 2021 (21.12.2021) SG

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

(72) Inventors: ZHAO, Haitao; c/o National University of Singapore, Institute For Health Innovation and Technology, 21 Lower Kent Ridge Road, Singapore 119077 (SG). PAN, Sijun; c/o National University of Singapore, Institute For Health Innovation and Technology, 21 Lower Kent Ridge Road, Singapore 119077 (SG). SHAO, Huilin; c/o National University of Singapore, Institute For Health Innovation and

Technology, 21 Lower Kent Ridge Road, Singapore 119077 (SG).

(74) Agent: KINNAIRD, James, Welsh; Marks & Clerk Singapore LLP, Tanjong Pagar Post Office, P.O. Box 636, Singapore 910816 (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, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, 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, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, 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, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE,

(54) Title: CRITICALLY-LOCKED MECHANICAL METAMATERIAL FOR HYPER-RESPONSIVE MOLECULAR PROFILING

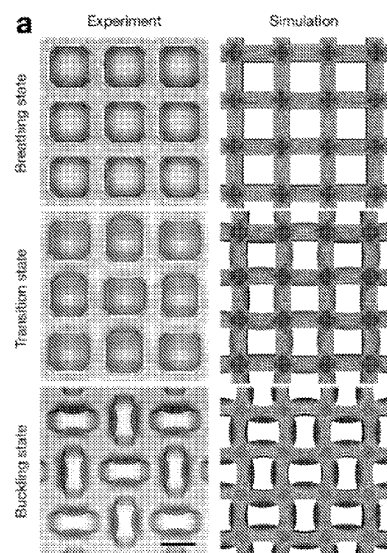


FIG. 8

(57) Abstract: Disclosed herein is a composite material comprising: a substrate; and a patterned hydrogel disposed on the substrate, wherein: the patterned hydrogel comprises stimulus-responsive constitutional units and constitutional units comprising one or more target molecule recognition moieties; the stimulus-responsive constitutional units are responsive to a stimulus and are configured to produce a stress value S_1 to the patterned hydrogel when the stimulus is applied; the target molecule recognition moieties are responsive to a target molecule and are configured to impart a stress value S_2 to the patterned hydrogel upon interaction with the target molecule; the patterned hydrogel is configured to reversibly buckle and/or reversibly swell when a threshold stress level T of the patterned hydrogel is crossed.

[Continued on next page]

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))*
— *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:

14 September 2023 (14.09.2023)