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

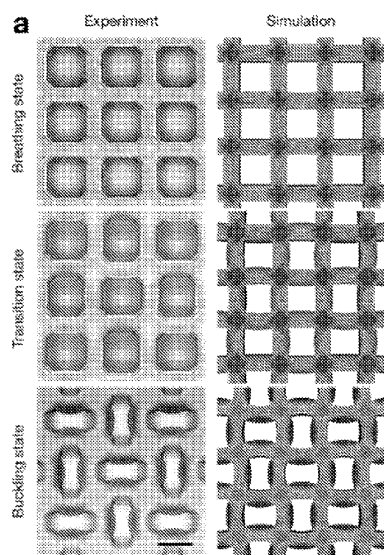


FIG. 8

(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.

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