Supporting Information

MXene and cellulose nanocrystal co-stabilized Pickering emulsions and their applications as templates to fabricate photothermal phase change material microcapsules

Zhen Zhang[1,2,3], Xiong Fang[1], Zhenghao Wang[1], Wang Sun[1], Yunting Zhang[1,3]*, Guofu Zhou[1]*

1. SCNU-TUE Joint Lab of Device Integrated Responsive Materials (DIRM), National Center for International Research on Green Optoelectronics, South China Academy of Advanced Optoelectronics, South China Normal University, Guangzhou 510006, China
2. Key Laboratory of Advanced Energy Materials Chemistry (Ministry of Education), Nankai University, Tianjin 300071, China
3. College of Teacher Education, South China Normal University, Guangzhou 510006, China

*Corresponding authors: Zhen Zhang, Email: zhangzhen@m.scnu.edu.cn; Yunting Zhang, Email: zhangyunting@scnu.edu.cn

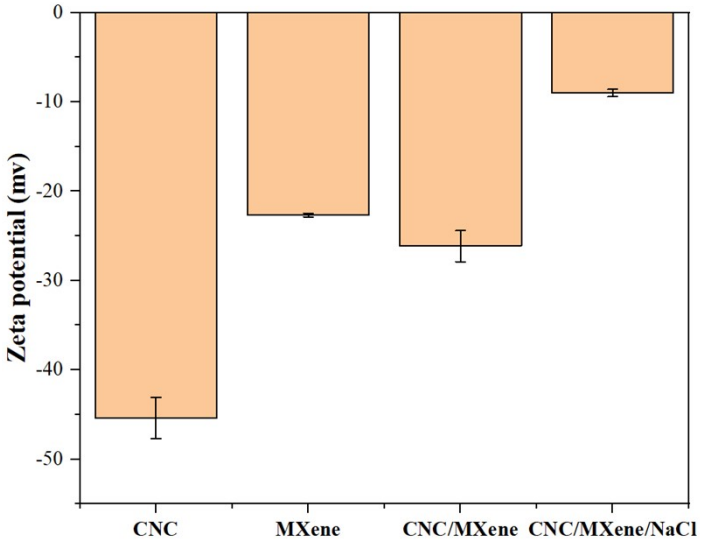

Figure S1. The comparison of the zeta potential of CNC, MXene, CNC/MXene, and CNC/MXene/NaCl

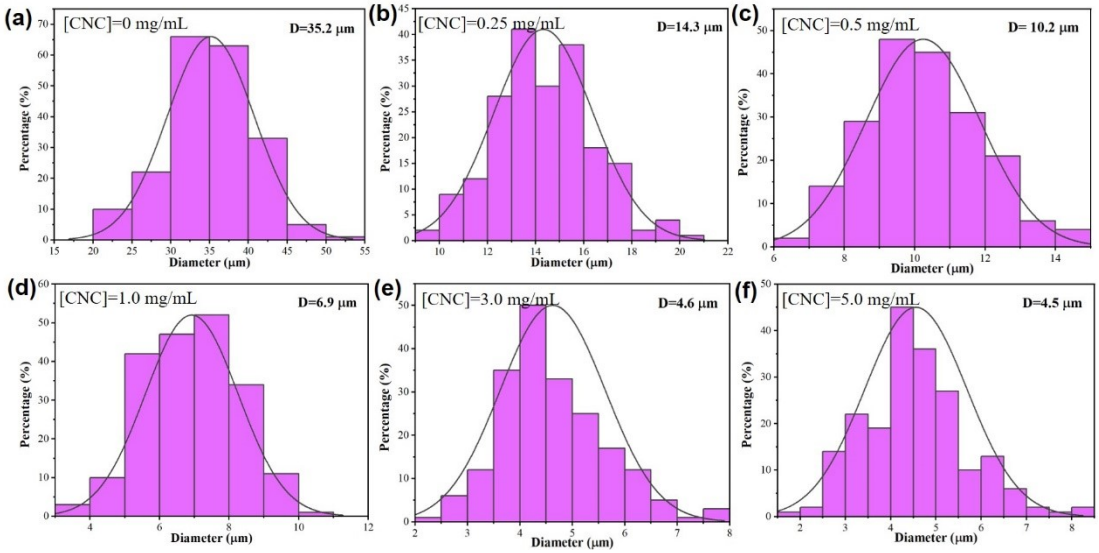

Figure S2. The size distribution of MC co-stabilized cyclohexane PE with NaCl concentration of 5 mg/mL, MXene concentration of 1 mg/mL, water-to-oil volume ratio of 4: 1 and varied CNC concentrations (0, 0.25, 0.5, 1.0, 3.0, 5.0 mg/mL)

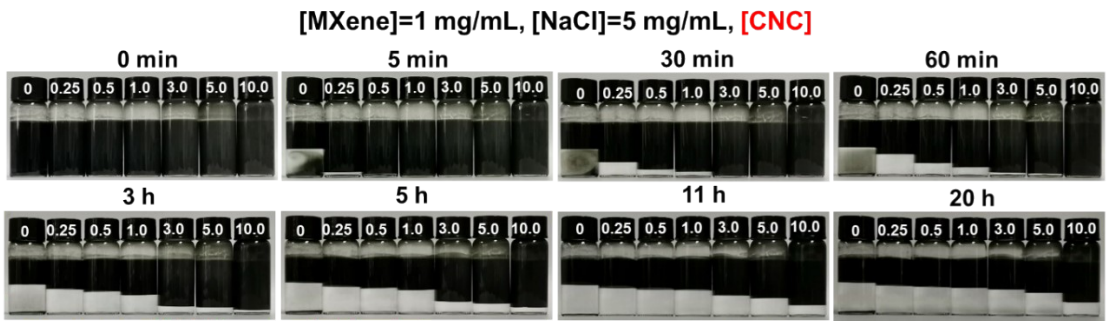

Figure S3. Photographs of MC co-stabilized Pickering emulsion with varied CNC concentrations (0, 0.25, 0.5, 1.0, 3.0, 50.0, and 10.0 mg/mL) at different standing still time

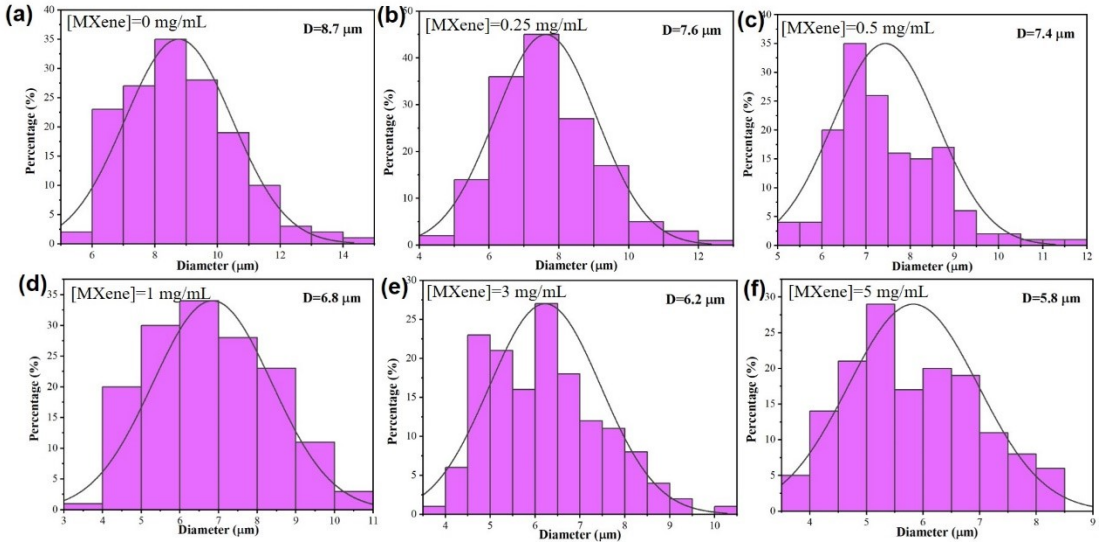

Figure S4. The size distribution of MC co-stabilized cyclohexane PE with NaCl concentration of 5 mg/mL, CNC concentration of 1 mg/mL, water-to-oil volume ratio of 4:1, and varied MXene concentration (0, 0.25, 0.5, 1.0, 3.0, 5.0 mg/mL)

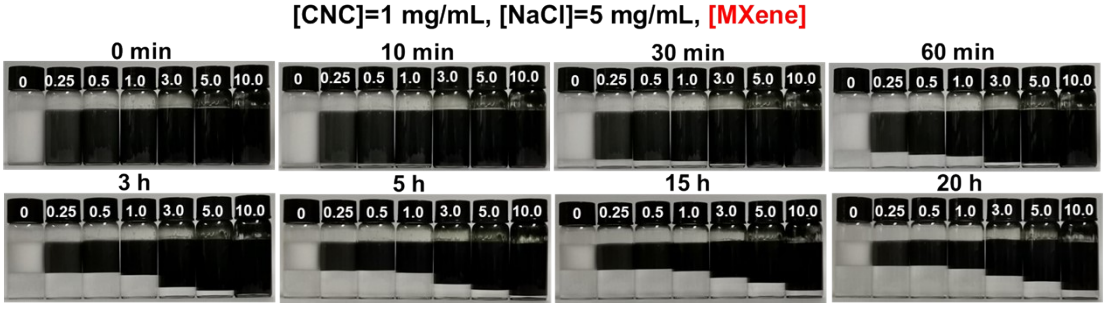

Figure S5. Photographs of MC co-stabilized Pickering with varied MXene concentration (0, 0.25, 0.5, 1.0, 3.0, 5.0 mg/mL) and different standing still time

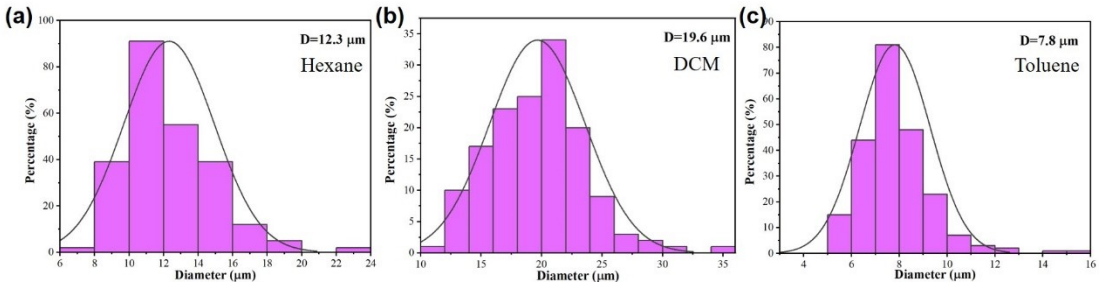

Figure S6. The size distribution of MC co-stabilized MC co-stabilized PE with (a) hexane, (b) dichloromethane, and (c) toluene as oil phases (at water-to-oil volume ratio of 3: 1, [CNC] of 3 mg/mL, [MXene] of 3 mg/mL, [NaCl] of 5 mg/mL), respectively

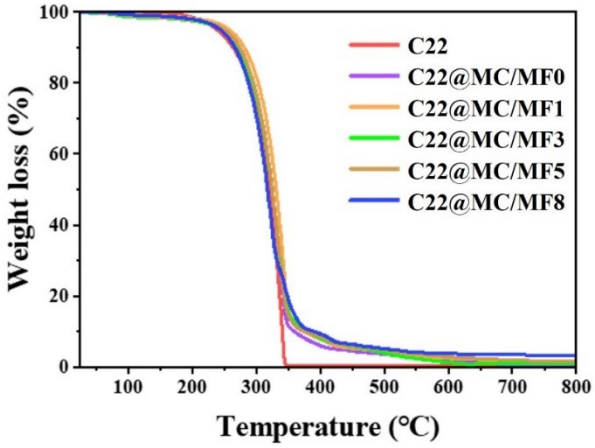

Figure S7. TGA of bulk C22 and C22 microcapsules

Table S1. Summaries of weight ratio of MXene to C22 and C22 microcapsules, temperature of C22 microcapsules after irradiation 20 mins

Samples	Weight ratio of MXene to C22 (%)	E_c	Weight ratio of MXene to C22 microcapsules (%)	Temperature of C22 microcapsules after irradiation 20 mins (°C)
C22@MC/MF0	0	85.5	0	41
C22@MC/MF1	0.23	85.4	0.19	54
C22@MC/MF3	0.70	85.0	0.57	56
C22@MC/MF5	1.17	85.3	1.01	59
C22@MC/MF8	1.87	85.0	1.62	61