

Strengthening of Polymer Ordered Porous Material Based on Layered Nanocomposite Internal Structure

Liping Heng^{a,*}, Xieyou Guo^a, Tianqi Guo^a, Bin Wang^{*b} and Lei Jiang^a

^a School of Chemistry and Environment, Beihang University, Beijing 100191, China.

E-mail: henglp@iccas.ac.cn Fax: +86 10-82627566

^b School of Environment, Tsinghua University, Beijing 100084, China

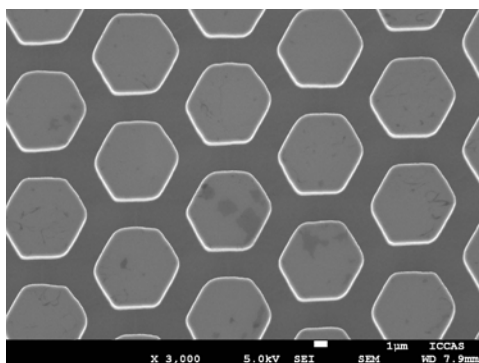


Figure S1 SEM image of hexagonal silicon pillar templates with 6 µm diameter. The distance between two pillars is 2 µm.

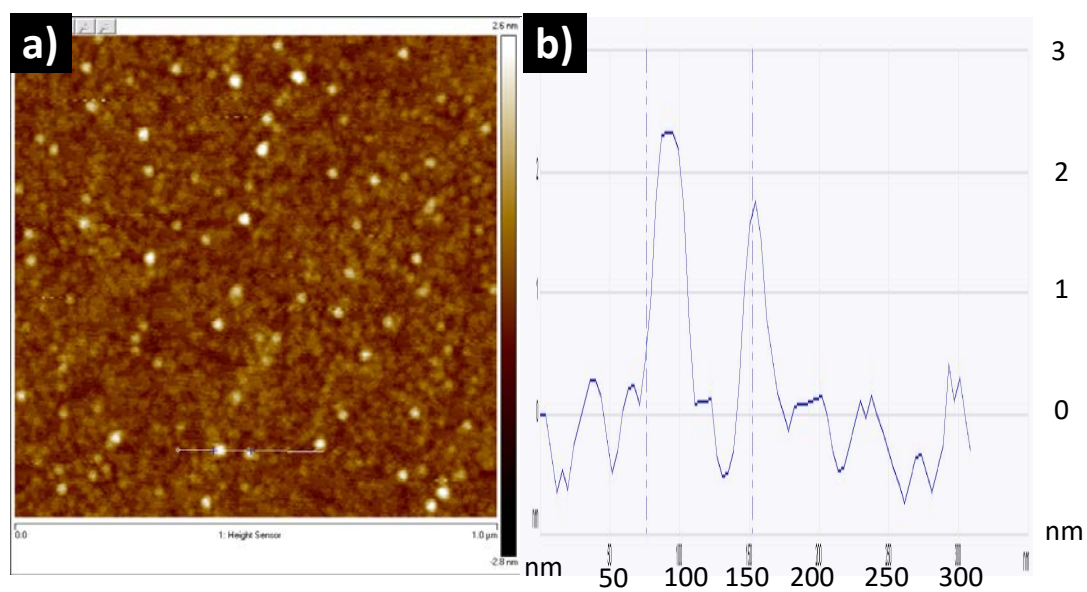


Figure S2 AFM images of clay platelets on silicon substrate. The average length and thickness of the clay platelets were 30-60 nm and 1-3 nm, respectively.



Figure S3 Photographs of free-standing gels, a) PAA porous gel, b) disordered MMT/PAA porous gel film, c) ordered layer MMT/PAA porous gel film.

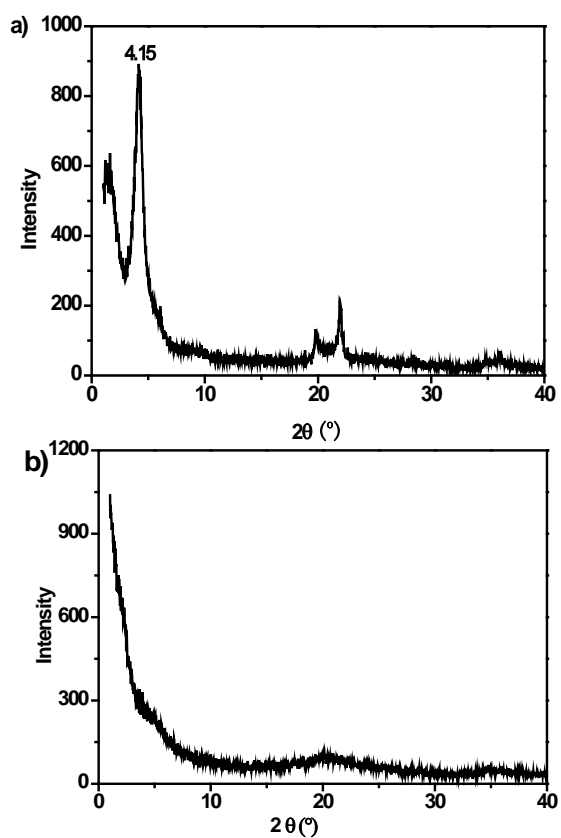


Figure S4 Typical X-ray diffraction profiles for dried materials of a) ordered layer PAA/MMT porous film; b) disordered PAA/MMT porous film. The spacing of MMT is 3.26 nm ($2\theta=4.15^\circ$) in the ordered layer PAA/MMT porous film, indicating the formation of clay-polymer-clay intercalation structure

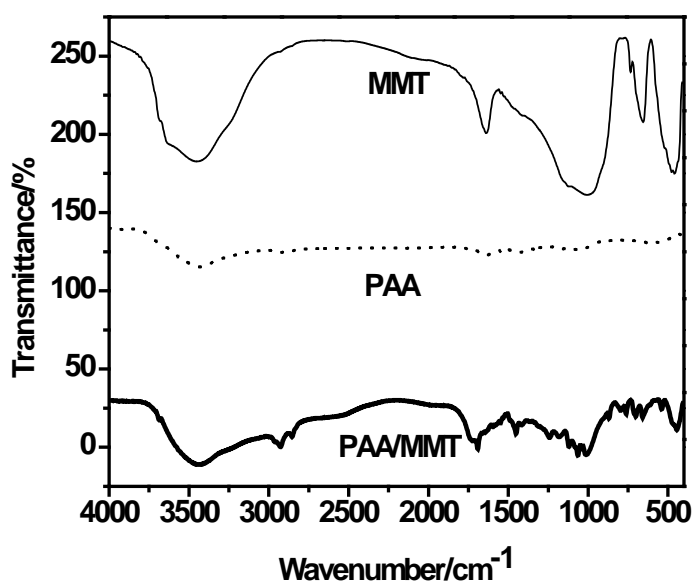


Figure S5 FTIR spectra of PAA, MMT, and dried ordered layer MMT/PAA porous film

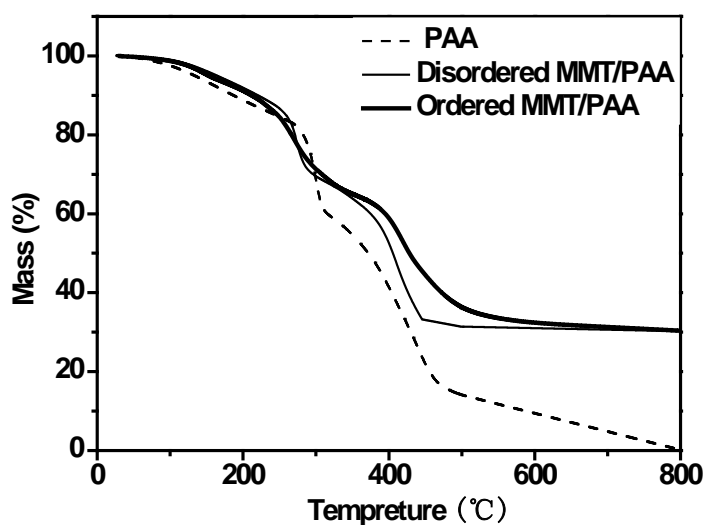


Figure S6 TGA curves of dried PAA gel, disordered MMT/PAA gel and ordered layer MMT/PAA gel, indicating that the mass ratio of clay and PAA in disordered MMT/PAA gel and ordered MMT/PAA gel is approximately 38:62.

Table S1 Weight losses of different type samples. W1 is the original weight of the samples, W2 is the sample weights after water absorption, W3 is the final weight of the samples after immersing in water for 72 h and then drying

Sample type	W1 (g)	W2 (g)	W3 (g)	Weight Loss%
PAA	1.28	7.35	1.24	3.11
Disordered MMT/PAA	2.59	40.56	2.45	5.03
Ordered MMT/PAA	2.71	43.52	2.60	4.15