

Supplementary Information

Imprinted MoS₂ achieving high-efficient self-separative molecule extraction

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Supplementary Information S1:



Figure S1. Imprinting in animals: a) ducklings on Corgi,^{w1} b) new-hatched ducks on hen,^{w2} and c) wolf cub on Rottweiler.^{w3}

Log in the websites below for more detailed information about imprinting in animals:

w1. **Ducklings on Corgi:** <http://www.thatcutesite.com/two-ducklings-imprint-on-a-corgi/>

w2. **Wolf cub on Rottweiler:** <http://www.dailymail.co.uk/news/article-1192276/Barking-true-The-touching-bond-Rottweiler-wolf-cub.html>

w3. **New-hatched ducks on hen:**
<https://www.deathandtaxesmag.com/181417/hilda-the-hen-sits-on-the-wrong-nest-hatches-crazy-cute-baby-ducks/>

Supplementary Information S2:

Sips model which shares both attributes of Langmuir and Freundlich models is defined as follow:

$$q_e = \frac{q_m K_s C_e^{n_s}}{1 + K_s C_e^{n_s}} \quad (1)$$

Here, q_m is the maximum adsorption capacity, q_e is the equilibrium adsorption capacity, C_e is the equilibrium concentration, K_s is the Sips isotherm constant related to the energy of adsorption, and n_s is the sorbent surface heterogeneity parameter. If the value of n_s is unity, the Sips model describes the typical Langmuir adsorption behavior, otherwise the Sips model reflects a complex multilayer adsorption (n_s not equal to unity). Optionally, as the value of C_e or K_s approaches zero, the Sips isotherm describes Freundlich isotherm behavior.

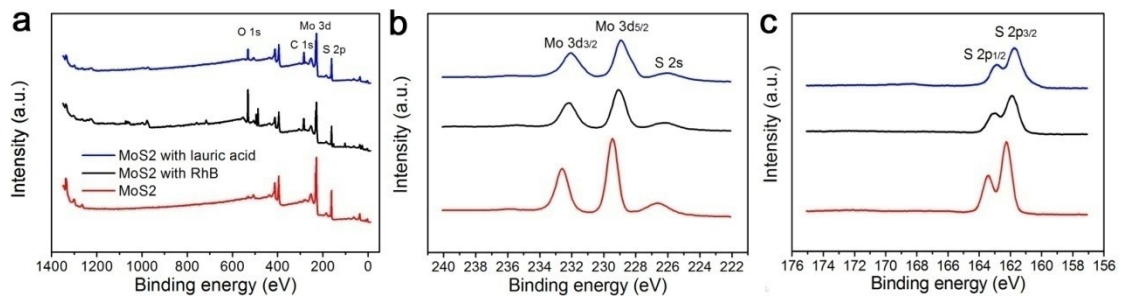


Figure S2. Xps spectra of pristine MoS₂ (red line), MoS₂ with adsorbed RhB (black line), and MoS₂ with adsorbed LA (blue line): a) Element scanning, b) Mo 3d, and c) S 2p.

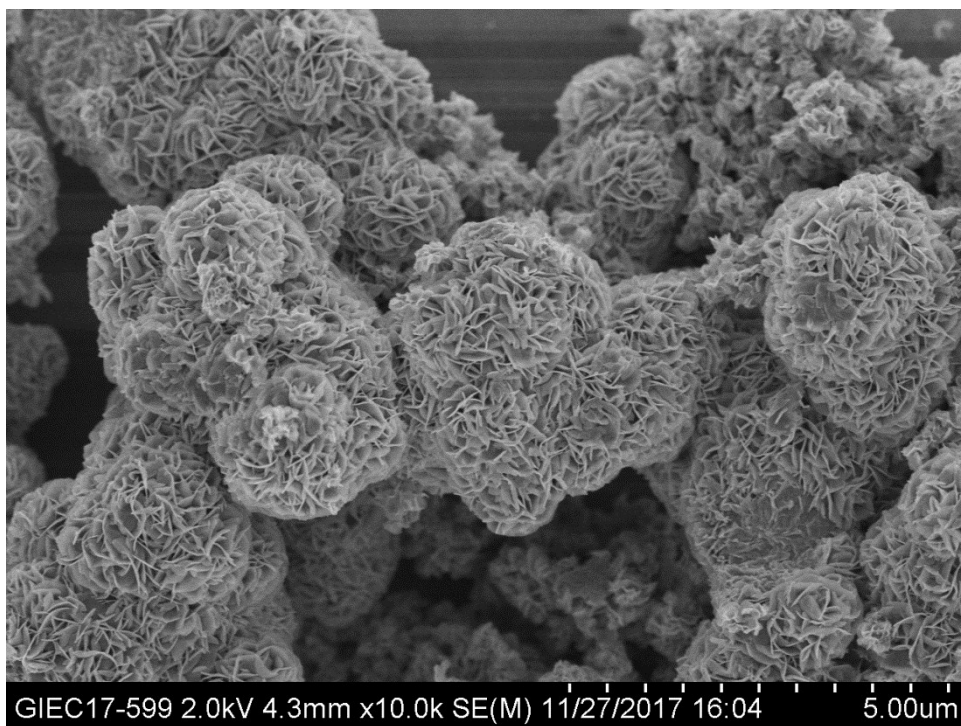


Figure S3. SEM image of as-prepared flower-like MoS₂.

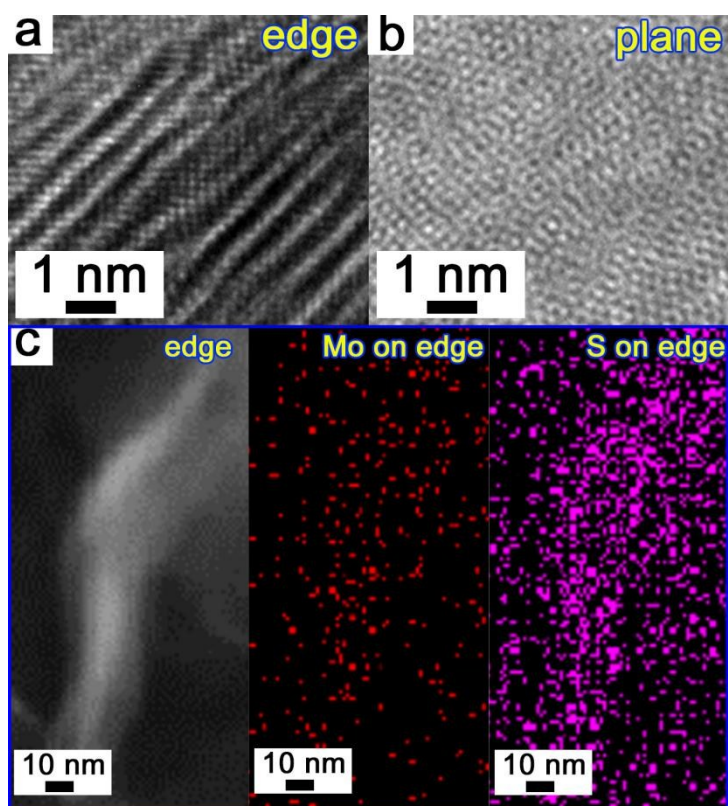


Figure S4. HRTEM of the (a) edge and (b) plane of MoS₂ nanosheet, and (c) Mo and S element mapping on MoS₂ edge.

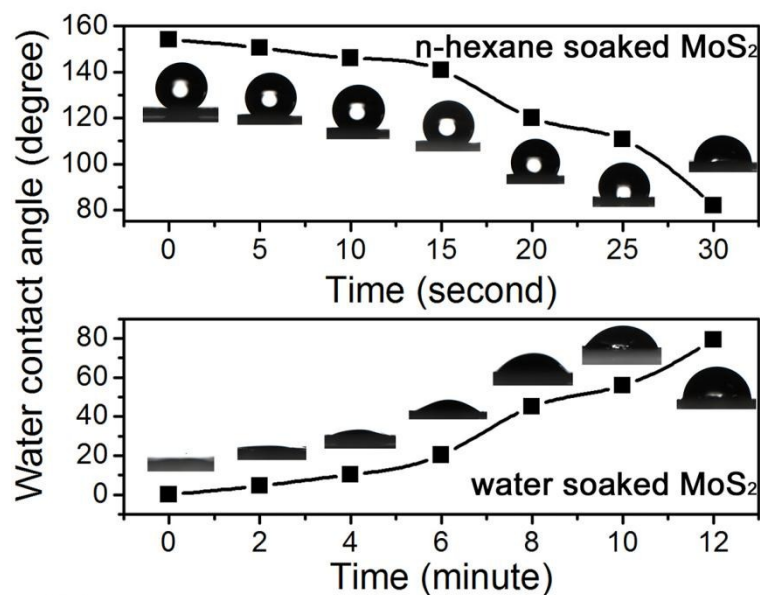


Figure S5. Water contact angle (WCA) test of n-hexane- (top graph) and water-imprinted MoS₂ (bottom graph) versus time.

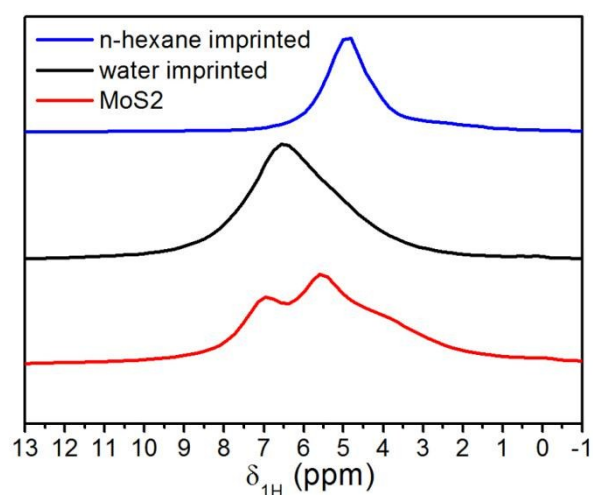


Figure S6. ¹H solid-state MAS NMR spectra of pristine, water- and n-hexane-imprinted MoS₂.

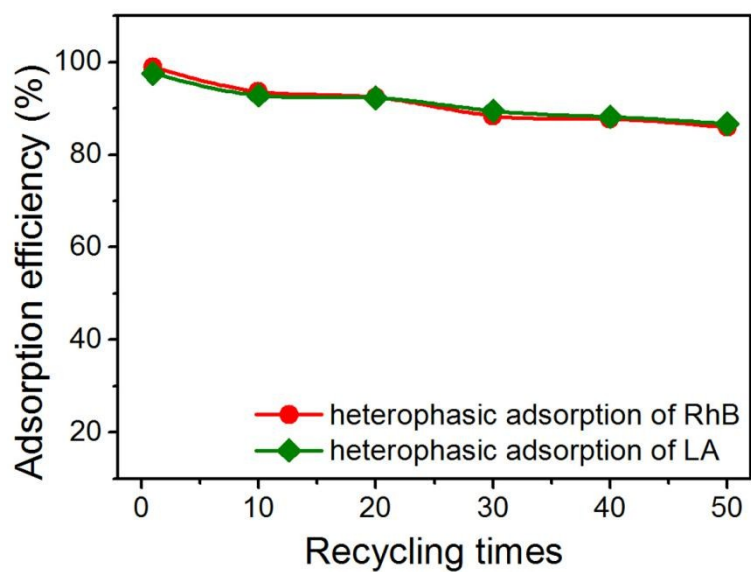


Figure S7. Recycling ability of imprinted MoS_2 for heterophasic adsorption.

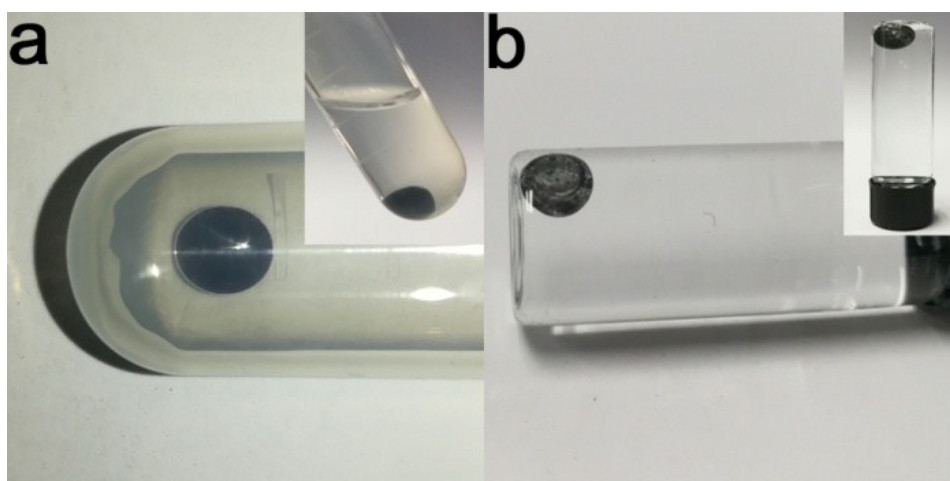


Figure S8. Imprinted MoS_2 d) wrapped by water droplet submerged in n-hexane and e) wrapped by n-hexane droplet submerged in water.

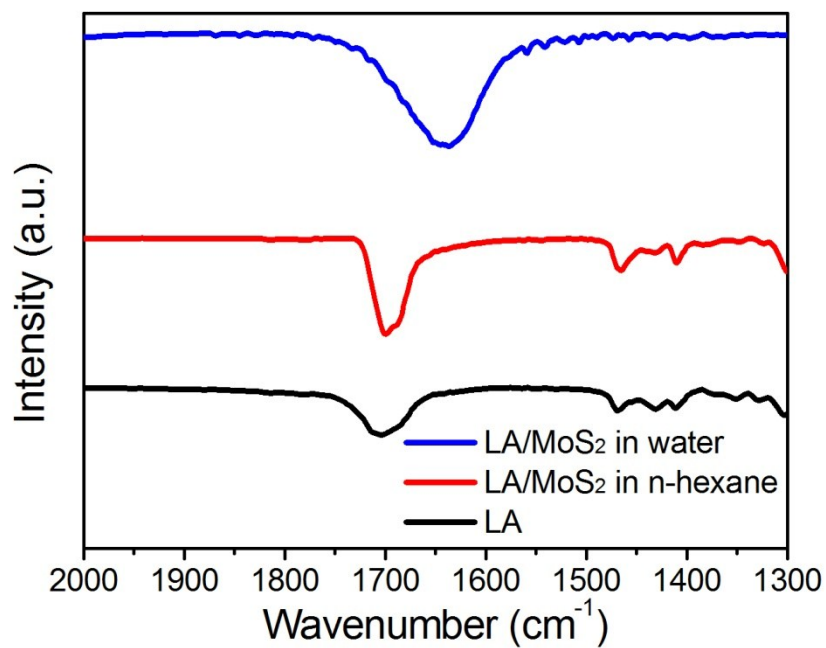


Figure S9. Fourier transformed infrared spectra (FTIR) of lauric acid (LA), LA adsorbed by MoS₂ in monophase (both MoS₂ and LA in n-hexane) and heterophase (MoS₂ in water but LA in n-hexane).

Figure S10 indicates that MoS₂ soaked by water and n-hexane have no change in its flower-like morphology, compared with as-prepared MoS₂.

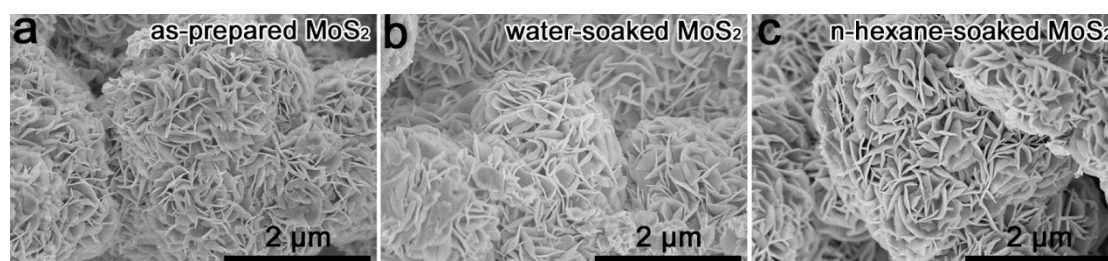


Figure S10. SEM images of a) as-prepared MoS₂, b) water-soaked MoS₂, and c) n-hexane-soaked MoS₂.