

## Supplemental Material

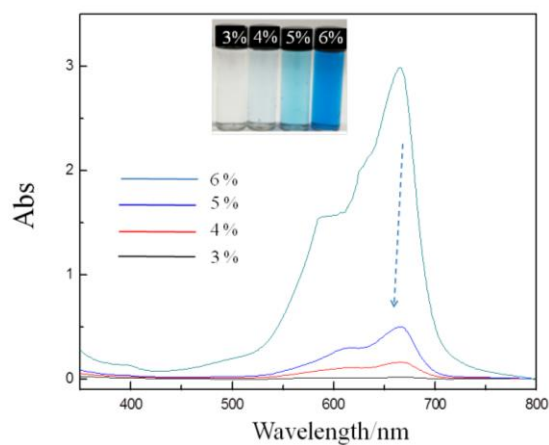


Fig.S1 UV-Vis spectra and images of the supernatants after adsorption by SEP with an mMB/mSEP of 3 %-6 %.

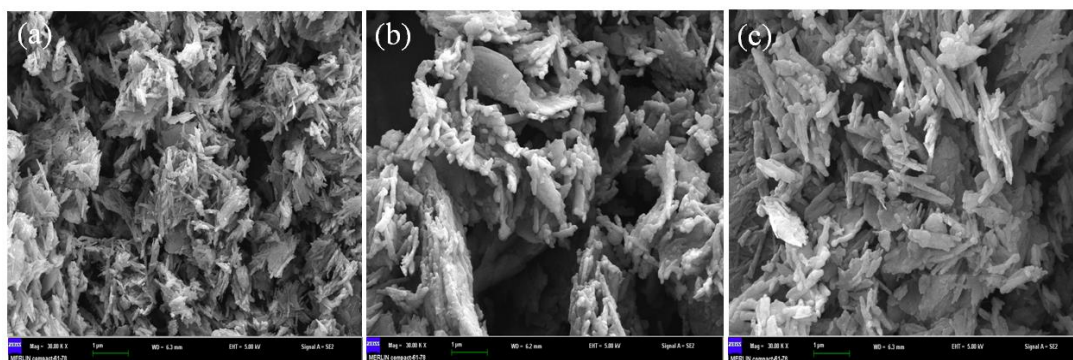


Fig.S2 SEM images of MB@POS/SEP prepared with 0.15 M HDTMS and C<sub>TEOS</sub> of (a) 0, (b) 0.15 and (c) 0.235 M.

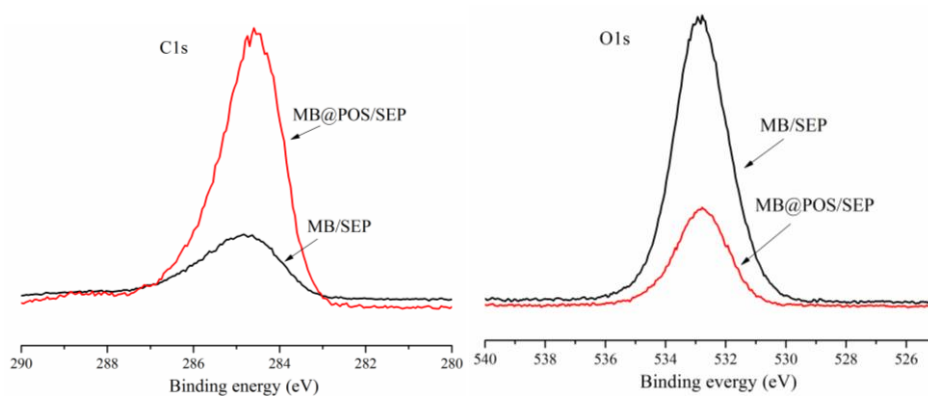


Fig.S3 C1s and O1s XPS spectra of MB/SEP and MB@POS/SEP.

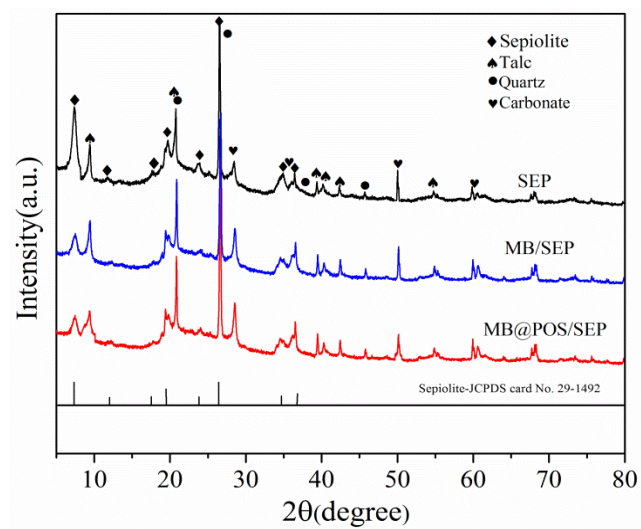


Fig.S4 XRD patterns of SEP, MB/SEP and MB@POS/SEP.  $C_{\text{HDTMS}}=0.15$  M and  $C_{\text{TEOS}}=0.15$  M.

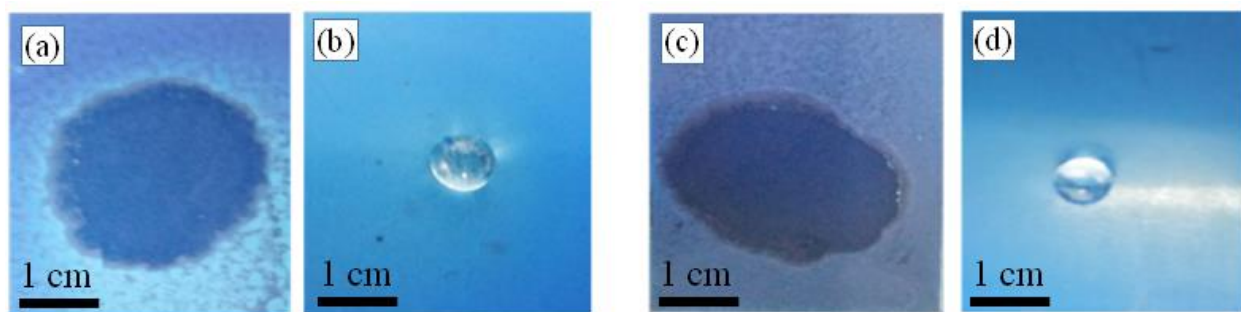


Fig.S5 Images of the MB/SEP (a, c) and MB@POS/SEP (b, d) coatings after attacks of 0.1 M HCl, 0.1 M NaOH.

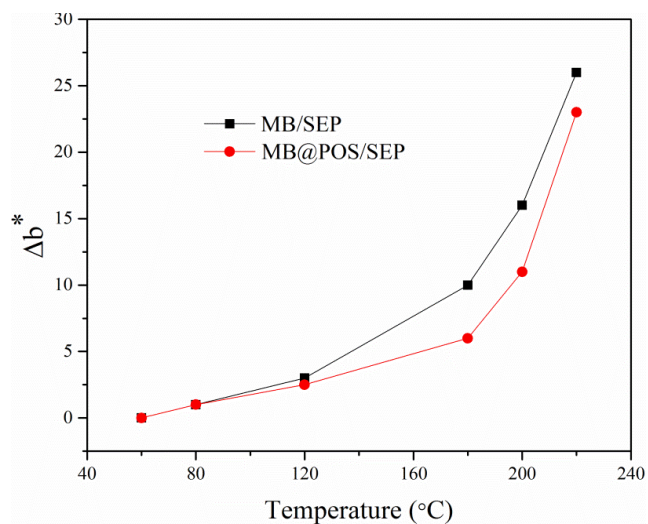


Fig.S6 Effect of calcination temperature on the color change ( $\Delta b^*$ ) (relative error  $\pm 3\%$ ).

Table.S1 The BET data and Zeta potentials of MB, SEP, MB/SEP and MB@POS/SEP.

Samples	Surface area	Pore volume (cm <sup>3</sup> /g)	Zeta potential (mV)
MB	-	-	0.6
SEP	165	0.42	-14.3
MB/SEP	80	0.31	-13.5
MB@POS/SEP	28	0.11	-