

Electronic Supplementary Information

Surface Engineering of SRMIST–2 Using Amine-Functionalized Polyhedral Oligomeric Silsesquioxane for Tunable Wettability and Sustainable Oil-water Separation

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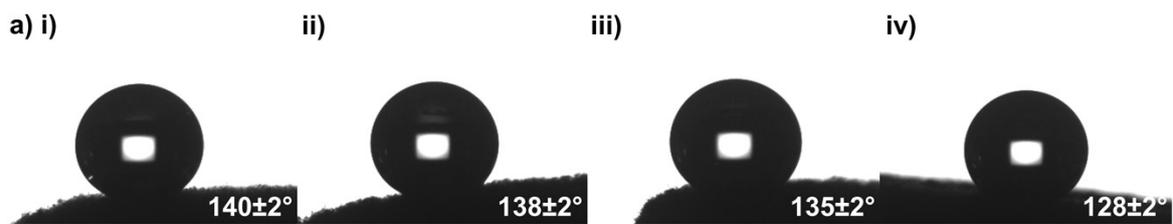
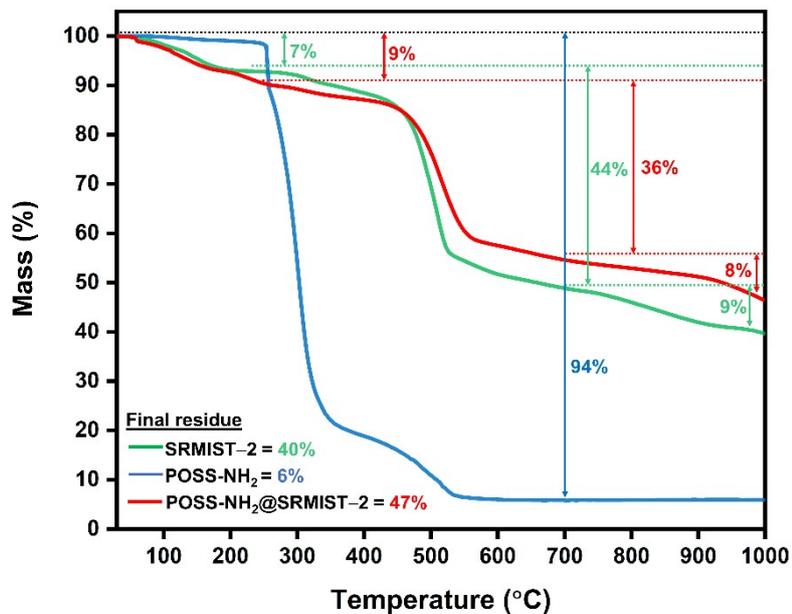


Figure S1. WCA of (a) POSS-NH₂@SRMIST-2 at SRMIST-2:POSS-NH₂ ratio of (i) 1:1;



(ii) 1:2; (iii) 1:3 and (iv) 1:4

Figure S2. TG analysis of POSS-NH₂@SRMIST-2

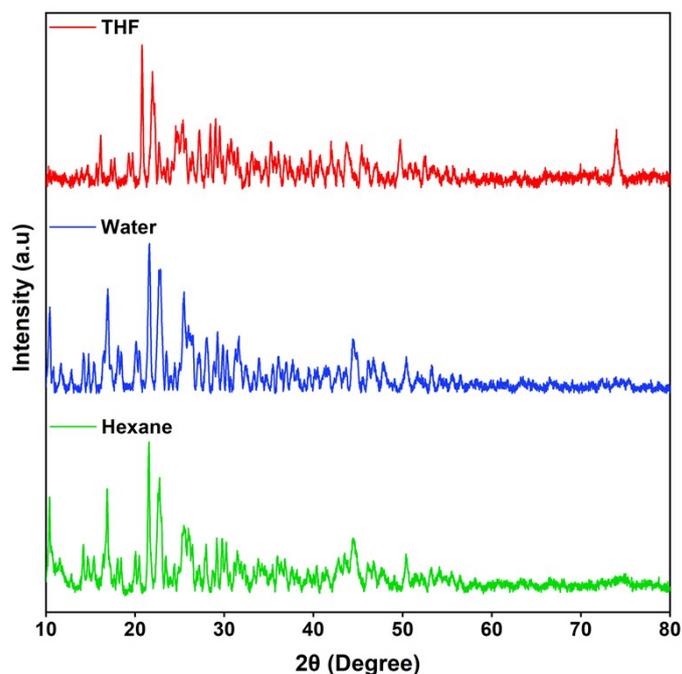


Figure S3. PXRD pattern of POSS-NH₂@SRMIST-2 refluxed on Hexane, THF and Water for 8 hours

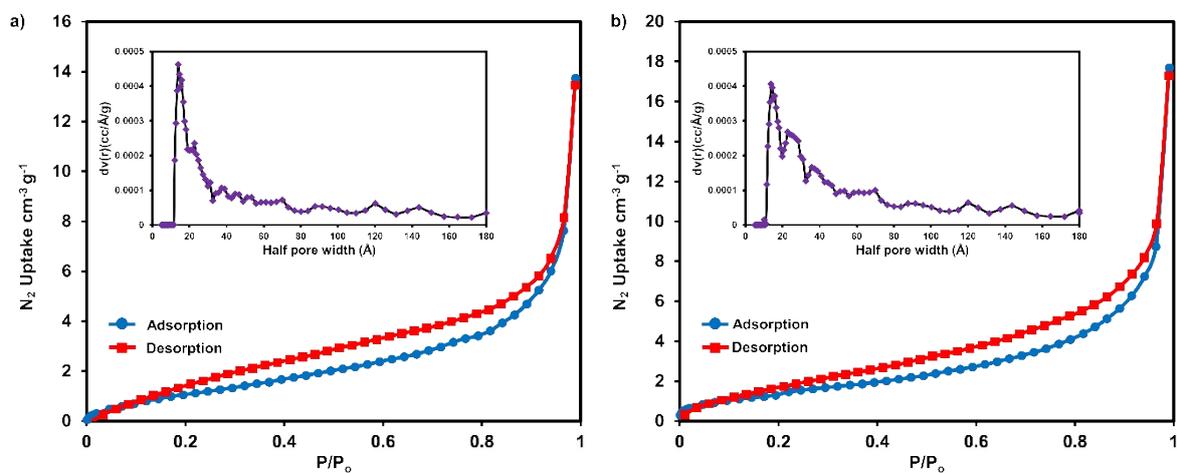


Figure S4. N₂ gas sorption of (a) POSS-NH₂@SRMIST-2 and (b) SRMIST-2; inset shows pore size distribution

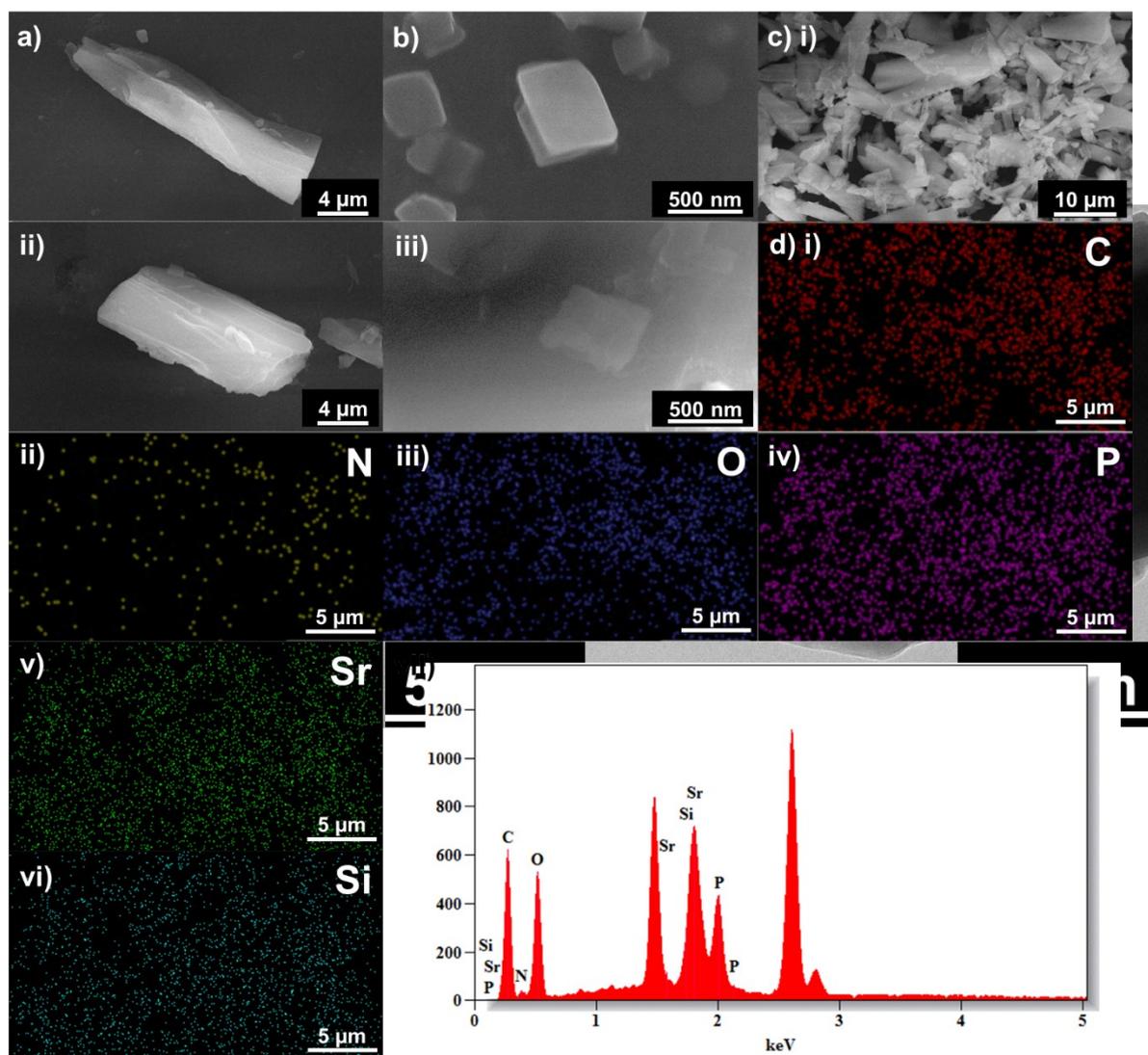


Figure S5. HR-SEM image of (a) SRMIST-2; (b) POSS-NH₂; (c) POSS-NH₂@SRMIST-2 and (c iii) POSS-NH₂ focussed on the surface of SRMIST-2; (d) Elemental mapping of POSS-NH₂@SRMIST-2 containing (i) carbon; (ii) nitrogen; (iii) oxygen; (iv) phosphorous; (v) strontium and (vi) silicon; (vii) EDX analysis of POSS-NH₂@SRMIST-2; unmarked peak corresponds to aluminium obtained from the substrate.

Figure S6. HR-TEM image (a) SRMIST-2 and of (b) POSS-NH₂@SRMIST-2.

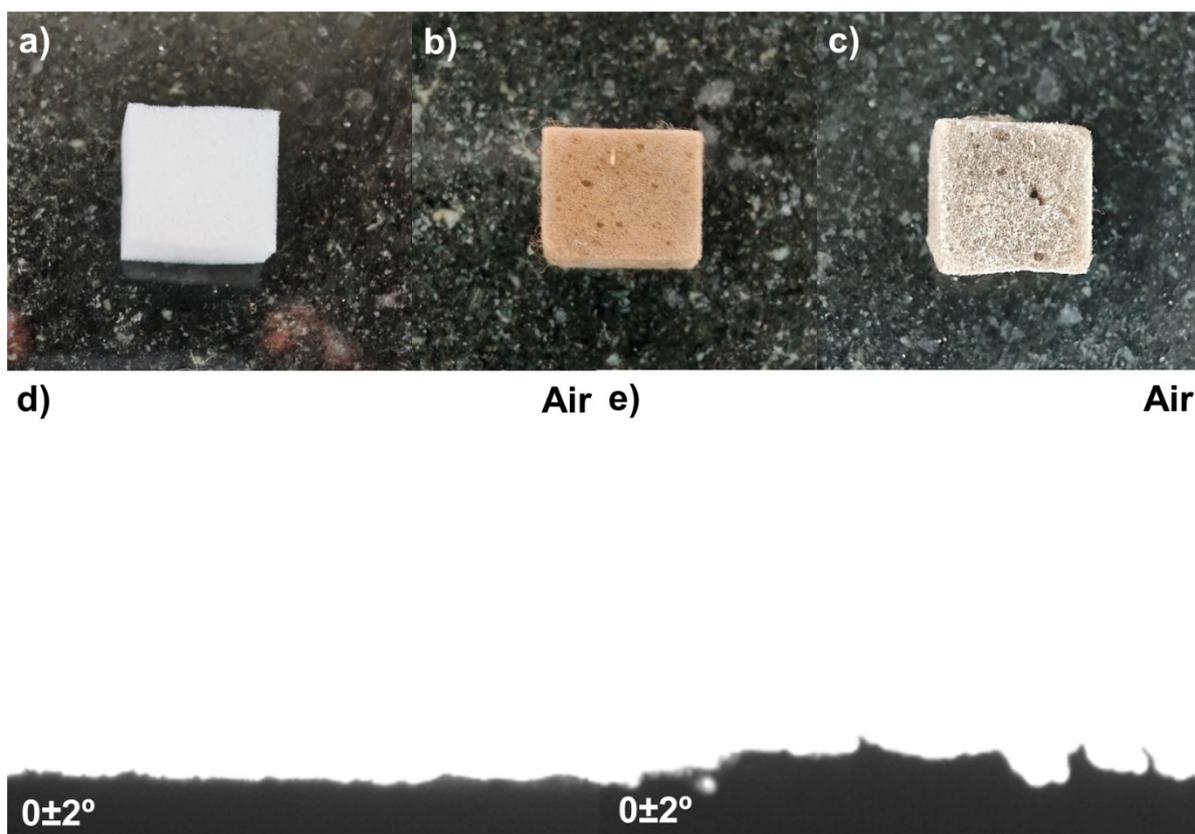


Figure S7. Photographic image of (a) MS; (b) PDA@MS; (c) POSS-NH₂@SRMIST-2@PDA@MS; OCA in air for (d) SRMIST-2 and (e) POSS-NH₂@SRMIST-2

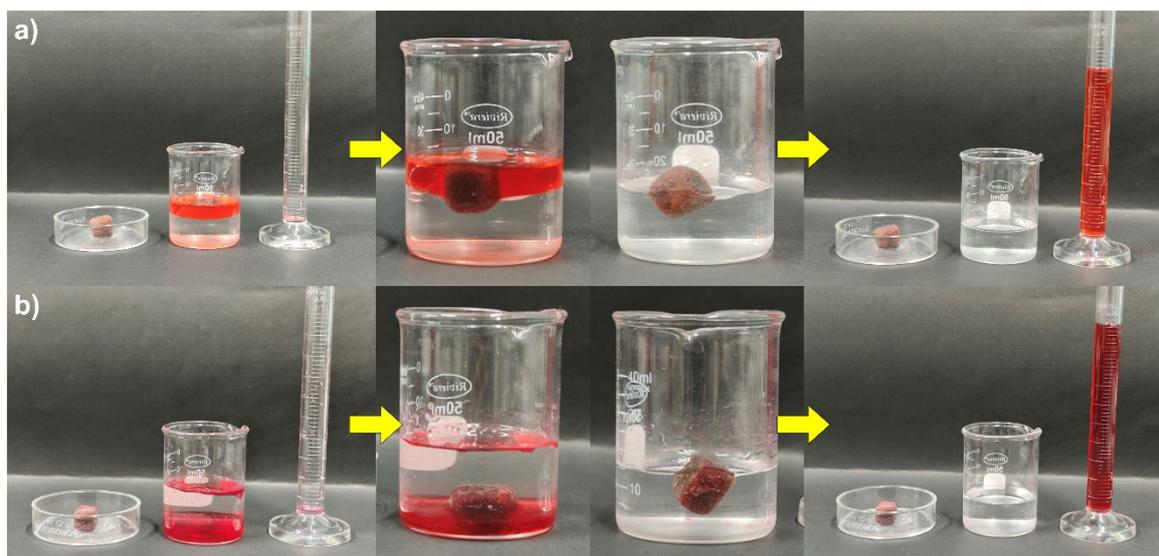


Figure S8. (a) Separation of toluene from toluene/water mixture using 30 cycles used POSS-NH₂@SRMIST-2@PDA@MS; (b) Separation of chloroform from chloroform/water mixture using 30 cycles used POSS-NH₂@SRMIST-2@PDA@MS.

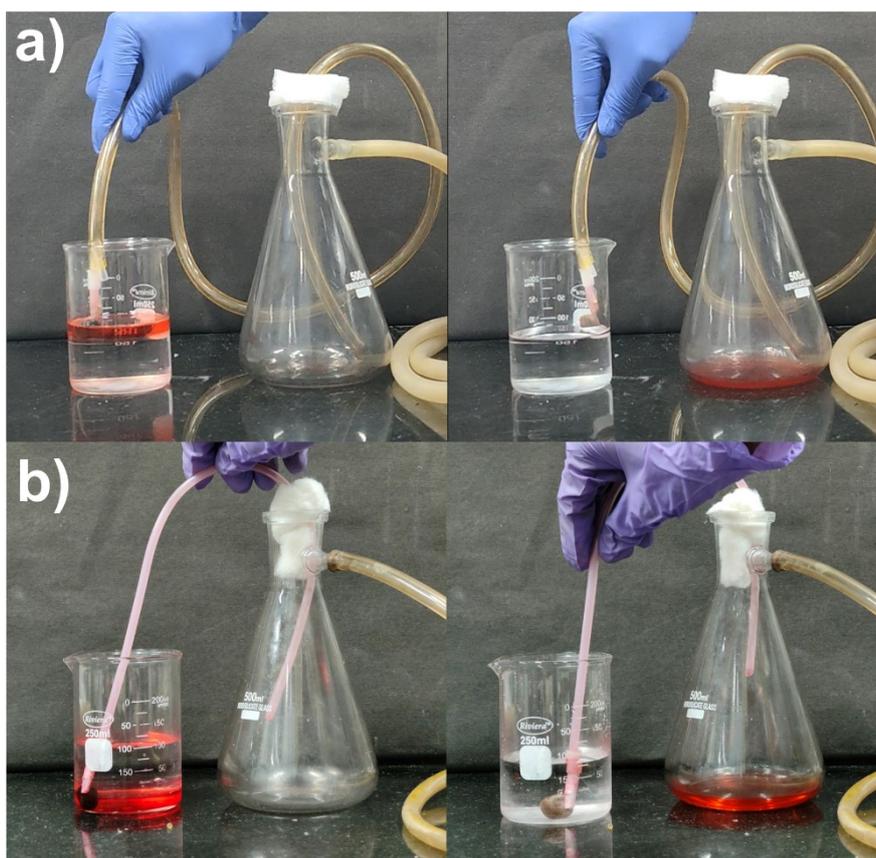


Figure S9. Continuous separation images of POSS-NH₂@SRMIST-2@PDA@MS for (a) toluene–water mixture and (b) chloroform–water mixture;

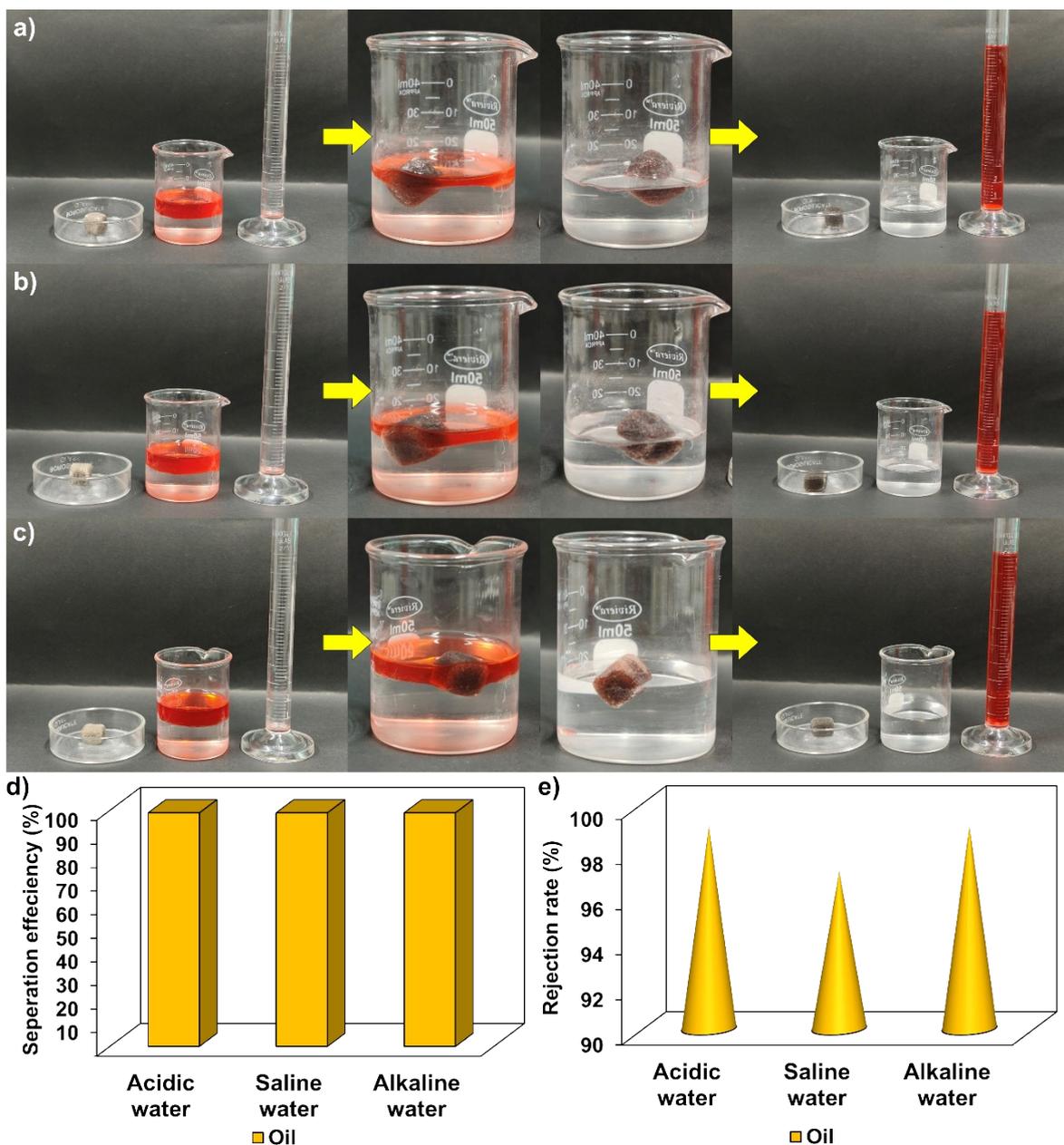


Figure S10. Separation image of oil from (a) oil-acid water; (b) oil-saline water; (c) oil-alkaline water; (d) separation efficiency and (e) water rejection rate of POSS-NH₂@SRMIST-2@PDA@MS.

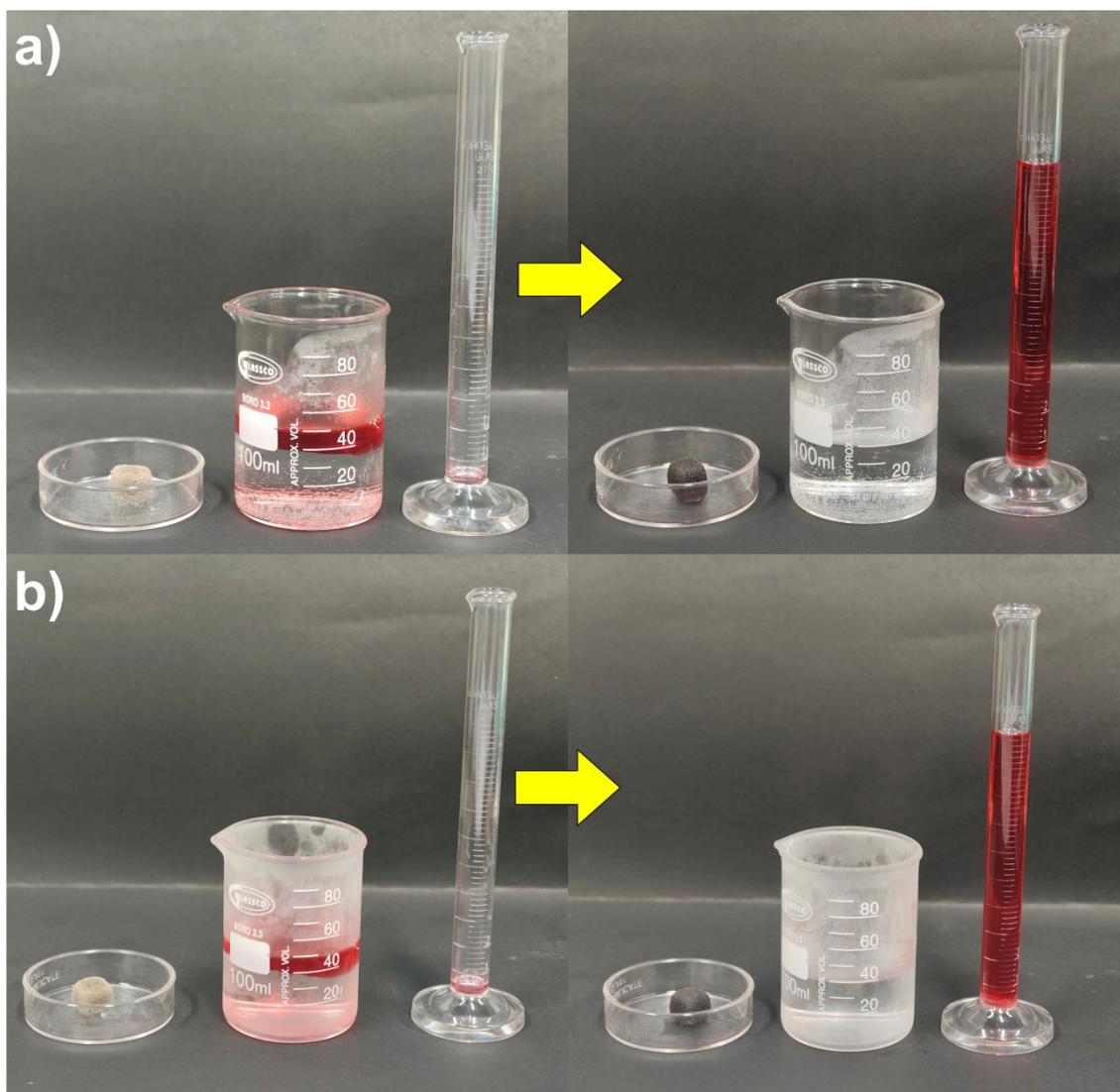


Figure S11. Separation images of POSS-NH₂@SRMIST-2@PDA@MS for (a) superhot toluene-water mixture and (b) supercold toluene-water mixture;

S. No	Material	Substrate	WCA	Reusability cycles	Separation efficiency	Flux	Emulsion separation	Ref
1	O-POSS@Cu ₃ (BTC) ₂	-	83±2°	-	-	-	-	1
2	ZIF-POSS	Sponge	157±2°	25	> 96%	-	-	2
3	Ph-POSS@HKUST-1	Sponge	137±4°	15	> 95%	-	-	3
4	Ph-POSS@ZIF-8	Sponge	143±2°	25	> 90%	-	-	4
5	O-Ph-POSS-FG	Sponge	151±2°	25	> 95%	< 20900 Lm ⁻² h ⁻¹	Water in Oil and Oil in Water emulsions	5
6	POSS-NH ₂ @SRMIST-2	Sponge	140±2°	30	> 94%	< 48000 Lm ⁻² h ⁻¹	Water in Oil emulsion	This work

Table S1. Separation efficiency, flux, reusability of POSS incorporated hydrophobic materials.

References

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