**Supporting Information**

# Multiple strategies to control the hydrophilic-hydrophobic balance of P(DMA-co-DMAEMA-co-QDMAEMA) coatings

*Jiao Chen, Hanhan Wang, Xing Liu, Xia Han*, Honglai Liu*

*Key Laboratory for Advanced Materials and School of Chemistry and Molecular Engineering, East China University of Science and Technology, Shanghai 200237, PR China*

*Corresponding author: Xia Han
E-mail: xhan@ecust.edu.cn

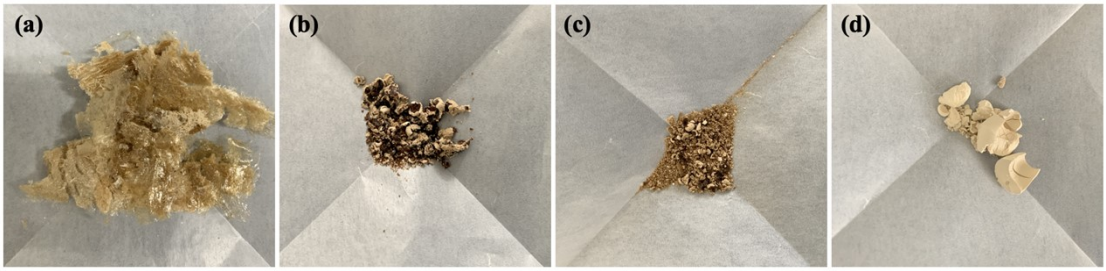


Figure S1. The digital photographs of PDDQ with different sulfonation ratios: (a) PDDQ0; (b) PDDQ40; (c) PDDQ60; (d) PDDQ100.

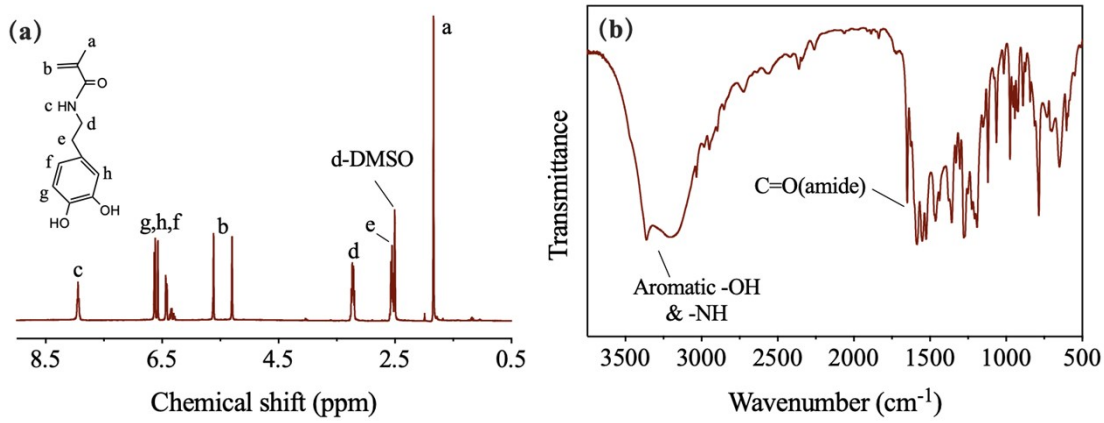


Figure S2. (a) $^{1}$H NMR spectrum of DMA; (b) FT-IR spectrum of DMA.

Table S1. Surface element composition obtained by XPS test.

| Samples | Atomic content (%) | | | | | |
|---|---|---|---|---|---|---|
| | Si | S | C | N | O | Fe/Cr/Mn/Ca |
| Mesh | 3.96 | 0.32 | 47.38 | 1.24 | 37.08 | 10.02 |
| PDDQ0-Mesh | 6.25 | - | 60.57 | 4.05 | 29.12 | - |
| PDDQ40-Mesh | 5.52 | 0.62 | 59.33 | 1.82 | 32.72 | - |
| PDDQ60-Mesh | 4.73 | 0.86 | 61.34 | 3.27 | 29.80 | - |
| PDDQ100-Mesh | 2.14 | 1.18 | 76.21 | 2.73 | 17.74 | - |

Table S2. Fitting results of the N 1s high-resolution spectrum of the modified surface.

| Samples | Peak position | | Proportion of integral area | | Sulfonation ratio |
|---|---|---|---|---|---|
| PDDQ0-Mesh | 399.5 eV | 401.9 eV | 63.07 | 36.93 | 0 mol% |
| PDDQ40-Mesh | 399.5 eV | 402.3 eV | 55.52 | 44.48 | 44 mol% |
| PDDQ60-Mesh | 399.5 eV | 402.3 eV | 43.16 | 56.84 | 57 mol% |
| PDDQ100-Mesh | 399.5 eV | 402.3 eV | 43.84 | 56.17 | 100 mol% |

Table S3. The oil leakage situations of PDQ-modified SSMs within 1 minute after the end of the water phase separation.

| | PDQ0-Mesh | PDQ40-Mesh | PDQ60-Mesh | PDQ100-Mesh |
|---|---|---|---|---|
| Oil droplets | 190 drops | 129 drops | 80 drops | - |