**Electronic Supplementary Information**

# 2-Hydroxy-naphthyl functionalized mesoporous silica for fluorescence sensing and removal of aluminum ion

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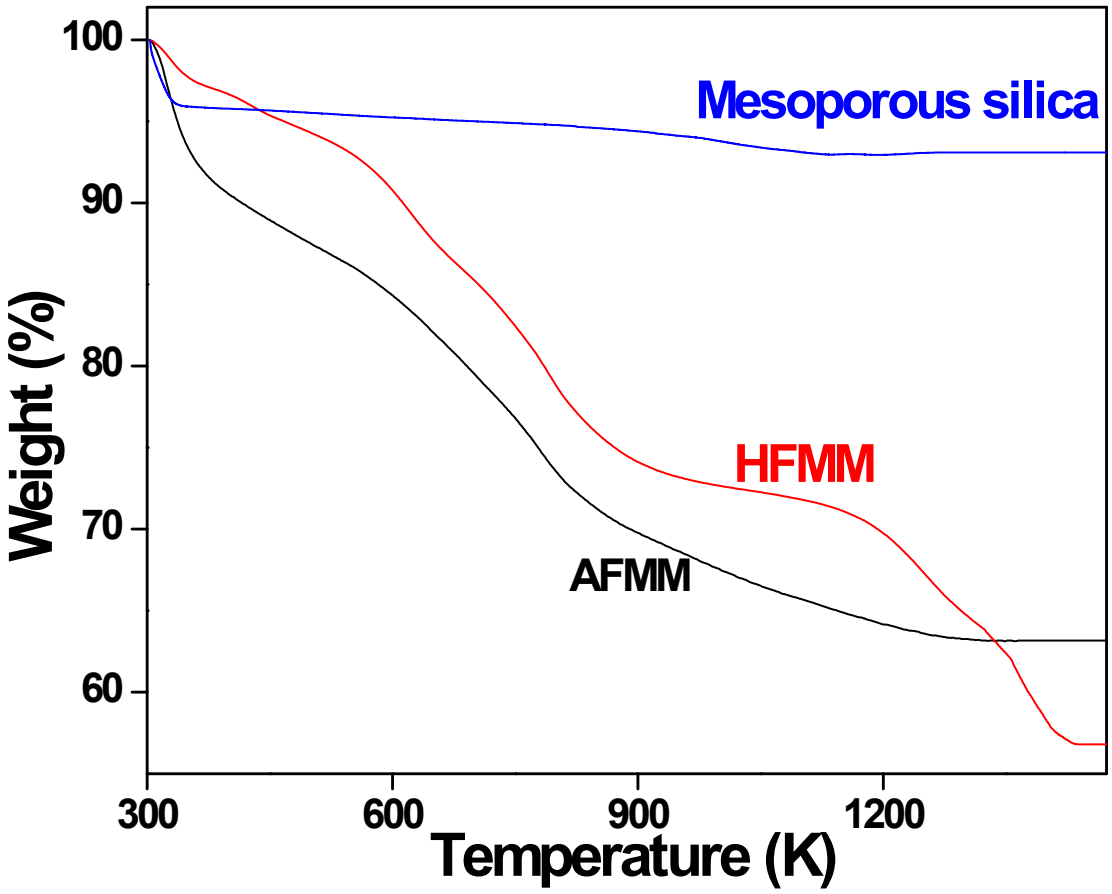


Fig. s1: Thermogravimetric analysis of mesoporous silica (blue), AFMM (black) and HFMM (red).

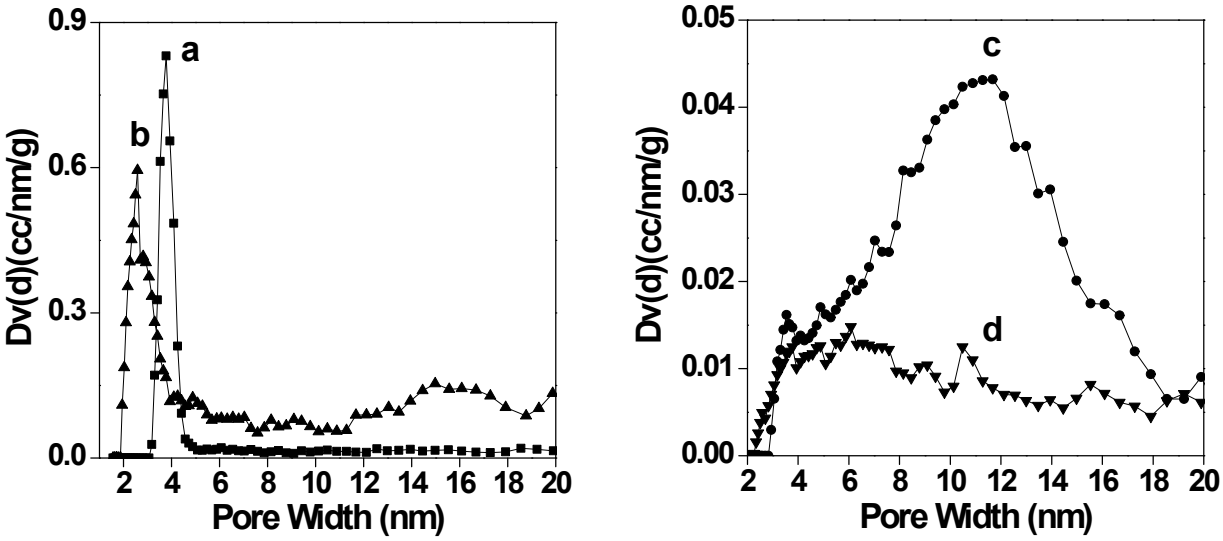


Fig. s2: Pore size distribution of mesoporous silica (a), AFMM (b), HFMM (c) and Al bound HFMM (d).

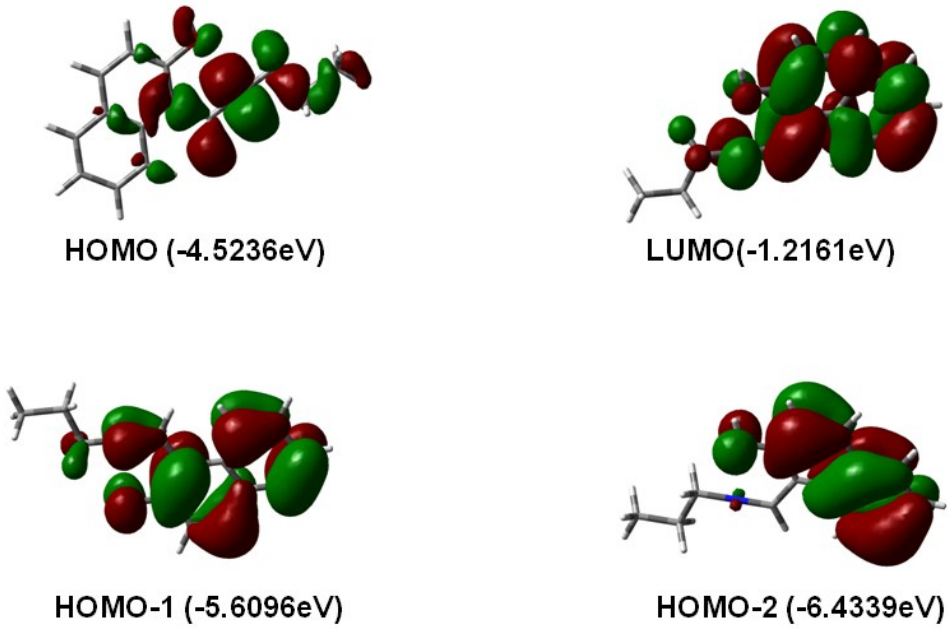


Fig. s3: Frontier MOs of OF and its aluminum complex, OF-Al.

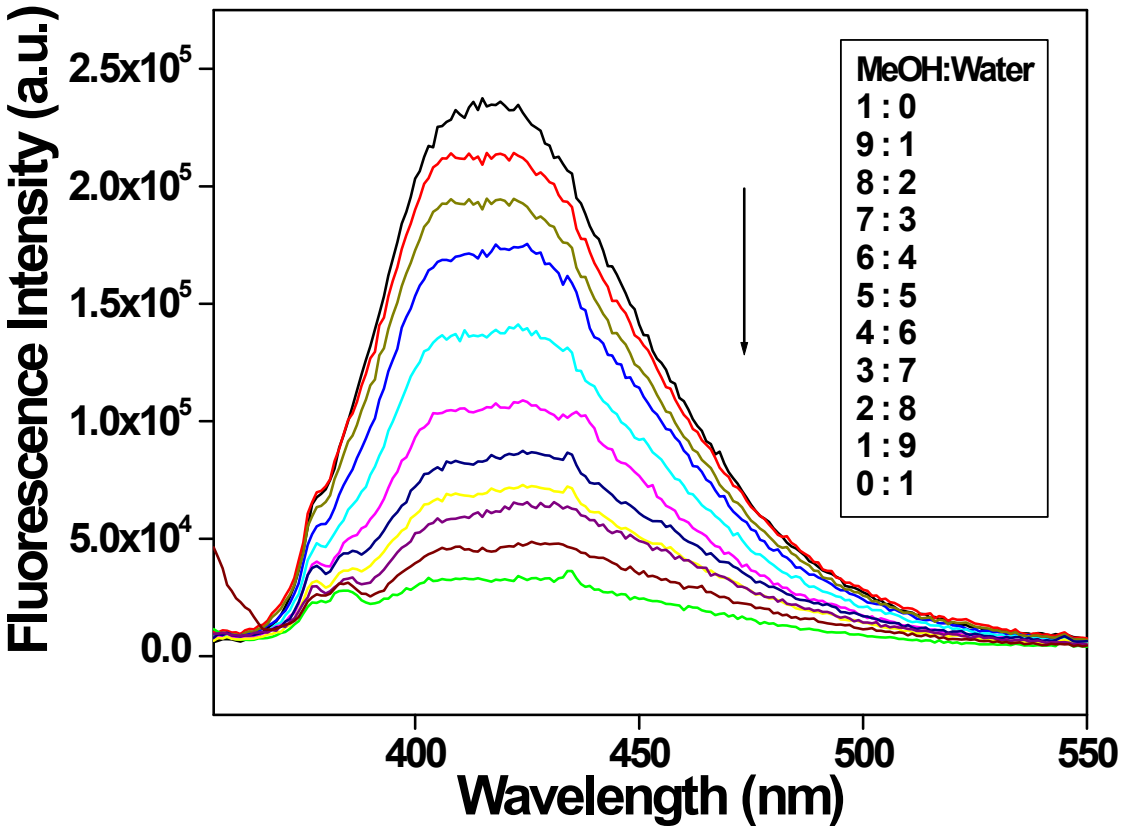


Fig. s4: Emission intensity of HFMM (0.7 mg/l) in the presence of 800 μM of $Al^{3+}$ in various ratio of methanol/water.

**Calculation of the detection limit (LOD)**

Detection limit of HFMM for $Al^{3+}$ was determined from 3σ method by following equation: LOD = K* Sb1/S

Where K = 3 in this case; Sb1 is the standard deviation of the blank solution; S is the slope of the calibration curve obtained from Linear dynamic plot of F.I. vs [$Al^{3+}$].

Sb1=780.17267

S=131.21192

LOD = (3 × 780.17267)/131.21192 =17.84 μM

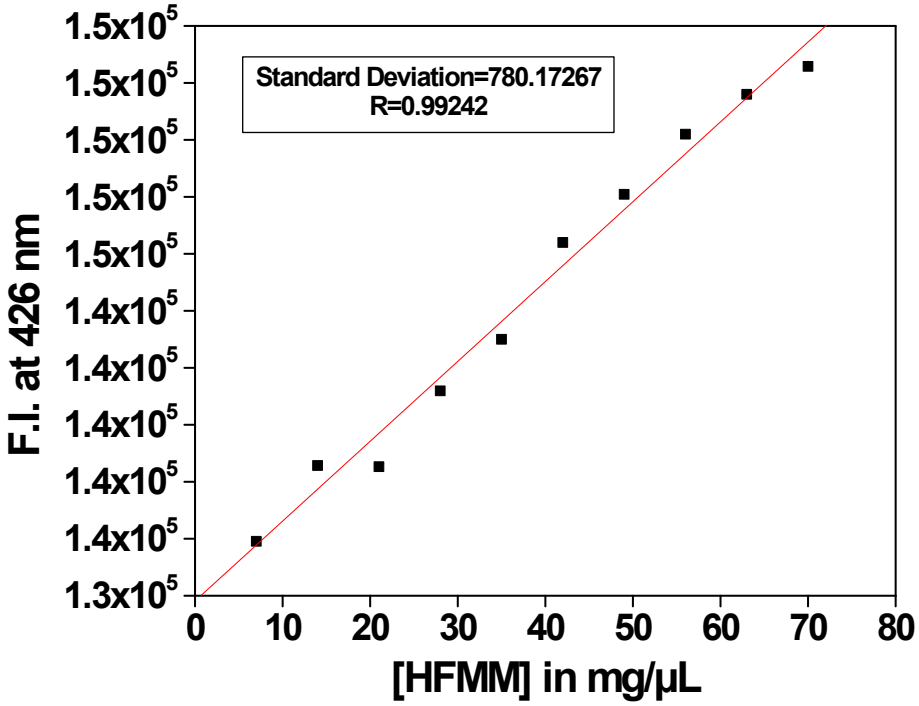


Fig. s5: Determination of Sb1 of the blank, HFMM solution

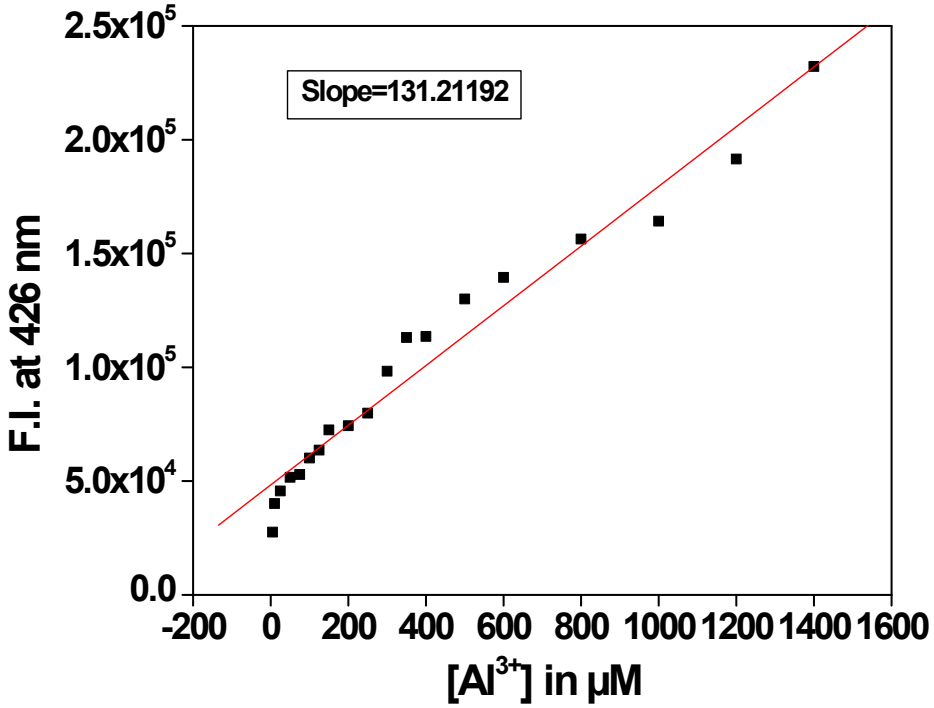


Fig. s6: Linear dynamic plot of F.I. (at 426 nm) vs. $[Al^{3+}]$ for the determination of S (slope); Concentration of HFMM = 0.7 mg/l.

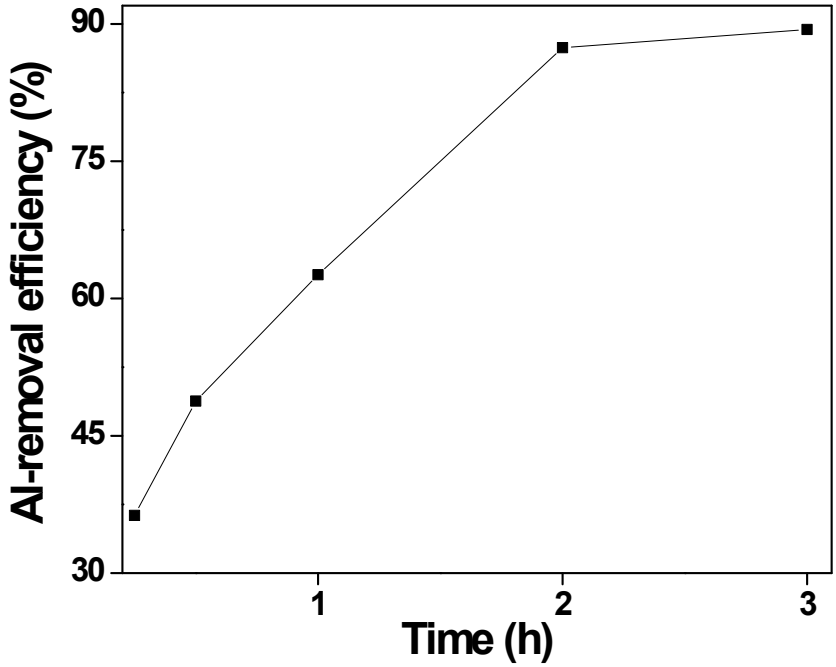


Fig. s7: Plot of aluminum removal efficiency of HFMM in 9:1 methanol/water against time

Table s1: Selected bond lengths and bond angles of OF-Al complex.

| Bond lengths (Å) | | | |
|---|---|---|---|
| C5-O16 | 1.3396 | Al17-O16 | 1.7811 |
| C11-N12 | 1.3200 | Al17-O18 | 1.8398 |
| C13-N12 | 1.4926 | Al17-O22 | 1.9673 |
| Al17-N12 | 1.9466 | | |
| Bond angles (◦) | | | |
| O16-Al17-O22 | 118.41 | N12-Al17-O18 | 95.24 |
| O16-Al17-O18 | 131.14 | N12-Al17-O16 | 93.37 |
| N12-Al17-O22 | 96.26 | C5-O16-Al17 | 132.91 |
| C11-N12-Al17 | 123.26 | C11-N12-C13 | 117.94 |