## **Supporting Information**

## Fluorane Sensitive Supercapacitive Microcrystalline MoO<sub>3</sub>: Dual Application in Energy Storage and HF Detection

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Figure S1: SEM image of MoO<sub>3</sub> under low magnification.



Figure S2: CV graph of MoO<sub>3</sub> at GCE at various concentration of HF (a) 0mM, (b) 0.3mM, (c) 0.5mM, and (d) 0.8mM HF at different scan rates.

## Estimation of specific capacitance

The specific capacitance of active material is calculated From CV curves using the equation<sup>1</sup> as below-

$$C_s = \frac{\oint IdV}{2\nu m \Delta V} \left( F/g \right), \tag{S1}$$

where  $\oint IdV$  is the area under CV curve, m is the mass of active material on GCE,  $\Delta V$  is potential window of CV curve, and v is the scan rate. The specific capacitance of active material and prepared symmetric supercapacitor device is also calculated From CV curves and GCD plots using the equation<sup>2</sup> as below-

$$C_{s} = \frac{I\Delta t_{d}}{m\Delta V} (F/g) , \qquad (S2)$$

where  $\Delta t_d$  is the discharging time.



Figure S3: Variation of specific capacitance as a function of scan rate at various concentration of HF acid.



Figure S4: Galvanostatic charging discharging curve of MoO<sub>3</sub>/GCE with 1mM HF in electrolyte (inset: Variation of specific capacitance as a function of current density).



Figure S5: Variation of peak current density with HF concertation.



Figure S6: Raman shift of MoO<sub>3</sub> before (as prepared) and after (0mM, 0.5 mM, and 1.0 mM HF+ 0.5M LiClO<sub>4</sub>) electrochemical characterization.



Figure S7: CV graph of MoO<sub>3</sub>/CC at 50 mV/s.



Figure S8: CV curve of  $MoO_3/CC$  on three different batches at 50 mV/s.



Figure S9: SEM image of MoO<sub>3</sub>/CC

## References

- (1) Yang, P.; Mai, W. Flexible Solid-State Electrochemical Supercapacitors. *Nano Energy* **2014**, 8, 274–290. https://doi.org/10.1016/j.nanoen.2014.05.022.
- (2) Alam, M.; Karmakar, K.; Pal, M.; Mandal, K. Electrochemical Supercapacitor Based on Double Perovskite Y2NiMnO6 Nanowires. *RSC Adv.* 2016, 6 (115), 114722–114726. https://doi.org/10.1039/C6RA23318J.