

## Supplementary Information for

### **A Monolithic Integration of Robust, Water-/oil-repellent layer onto Multilayer Encapsulation Films for Organic Electronic Devices**

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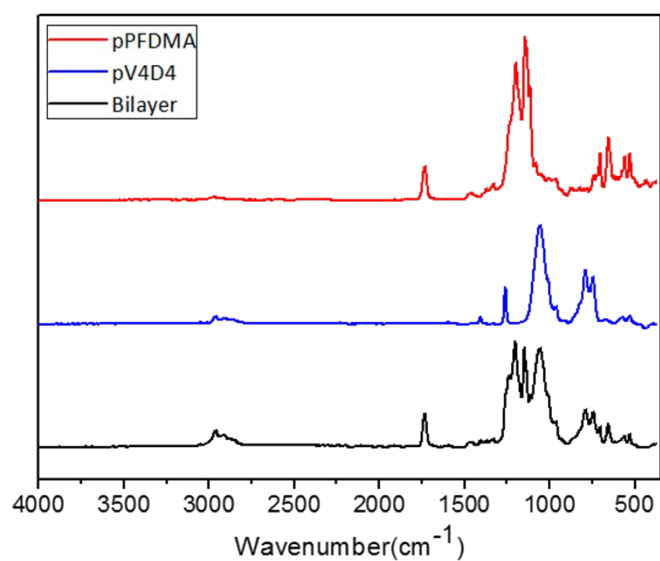


Figure S1. FTIR spectra of pPFDMA (top), pV4D4 (middle), and the stacked hydrophobic polymer (bottom)

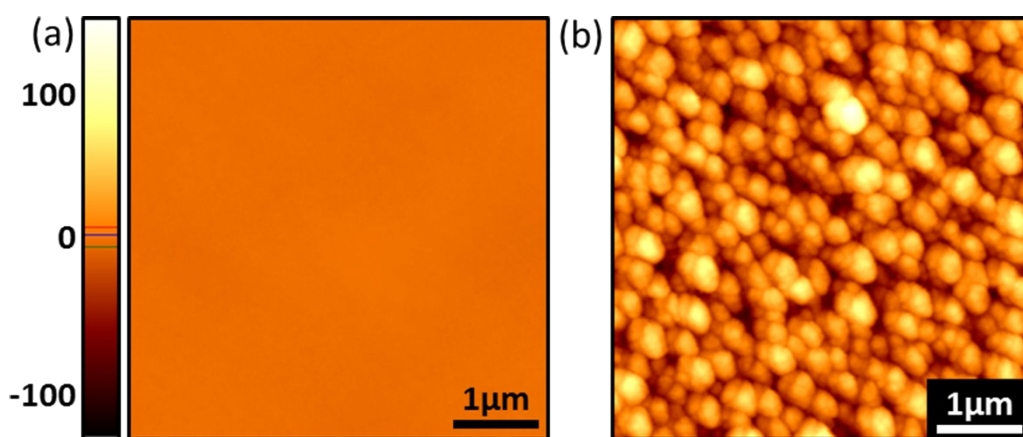


Figure S2. AFM images of (a) two dyads of the organic/inorganic multilayer TFE, and (b) the water-/oil-repellent multilayer TFE.

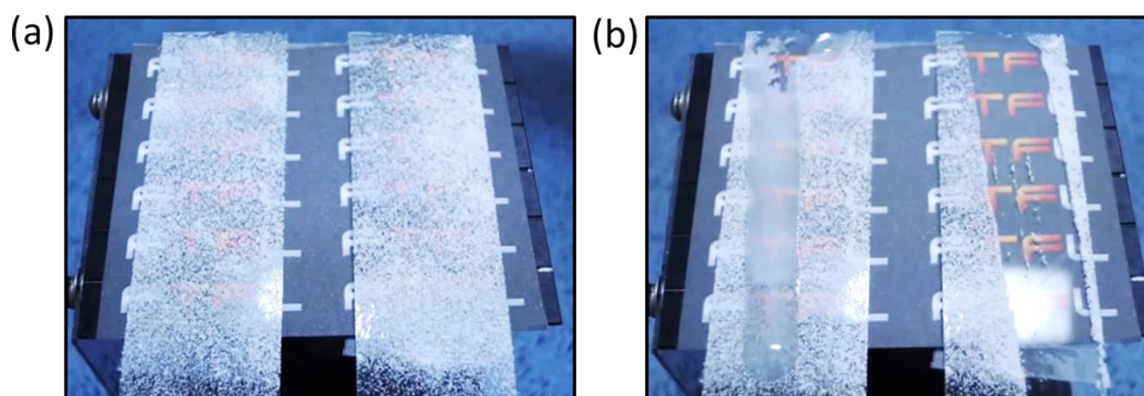


Figure S3. Still images of the self-cleaning property test. The sample on the left is a bare glass while the sample on the right is coated with the water-/oil-repellent multilayer TFE. The samples are tilted at 15°. (a) Before and (b) after rinsing the distributed SiO<sub>2</sub> powders with water droplets.

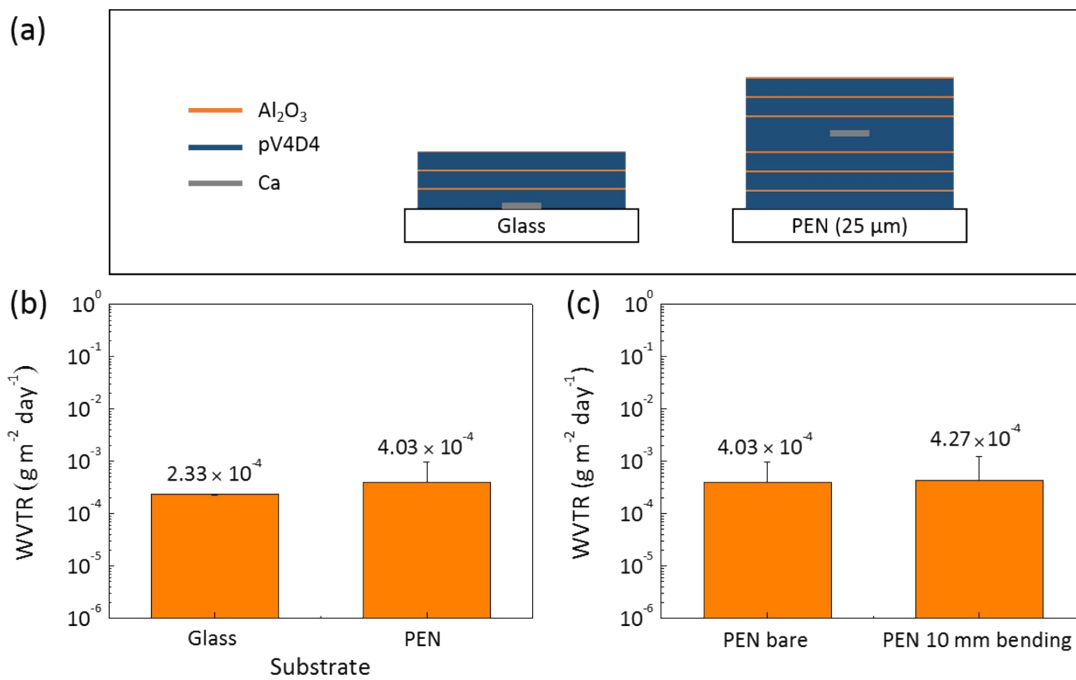


Figure S4. (a) Scheme of three-dyad pV4D4/Al<sub>2</sub>O<sub>3</sub> TFE on glass and PEN substrates. (b) Barrier performance of the TFE's on glass and PEN substrates. (c) Barrier performance of the TFE's on PEN substrates before and after bending (bending radius = 10 mm) for 1000 times.

Movie S1 shows the self-cleaning properties of the water-/oil-repellent multilayer TFE, and Movie S2 shows the water-repellency and flexibility of the water-/oil-repellent multilayer TFE on a PEN substrate. In Movie S2, a Ca film in the shape of 'KAIST' is encapsulated with the novel TFE. The movie files are available online.