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***Supporting information for***  
**Fluorous-Inorganic Hybrid Dielectric Materials for Solution-  
Processed Electronic Devices**

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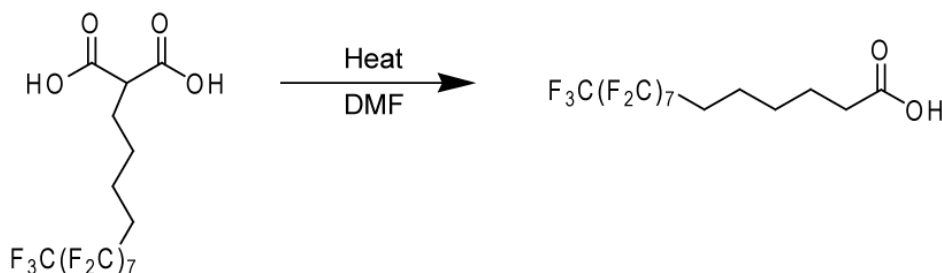
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## Experimental

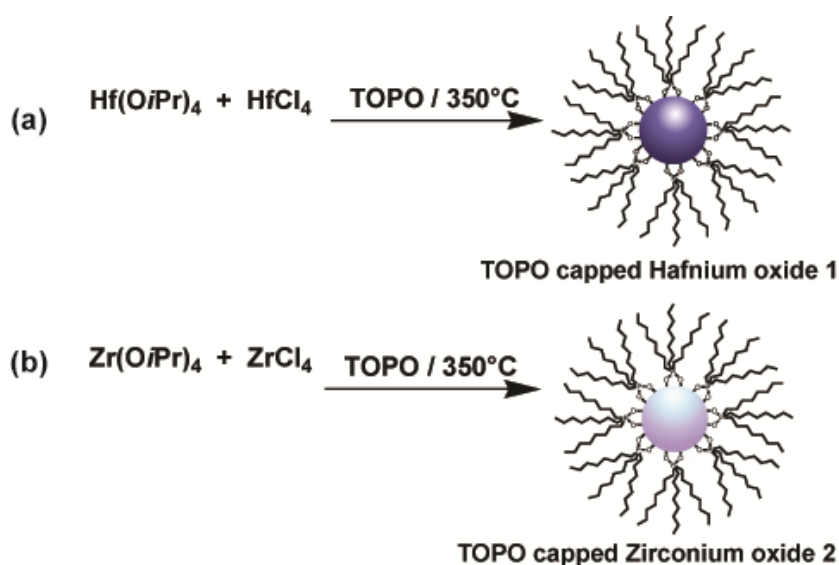
### Equipment

<sup>1</sup>H NMR spectra were recorded on a Varian Inova-400 (400 MHz) spectrometer at ambient temperature. Chemical shift were measured versus residual protic solvent (CHCl<sub>3</sub> at δ 7.26 ppm), which was used as an internal reference. All chemical shifts are quoted in parts per million (ppm) relative to the internal reference and coupling constants *J* are measured in Hz. The multiplicities of signals are abbreviated as follows: s (singlet), d (doublet), t (triplet), q (quartet), m (multiplet), dd (doublet of doublets), dt (doublet of triplets), dm (doublet of multiplets), tt (triplet of triplets), and br s (broad singlet).

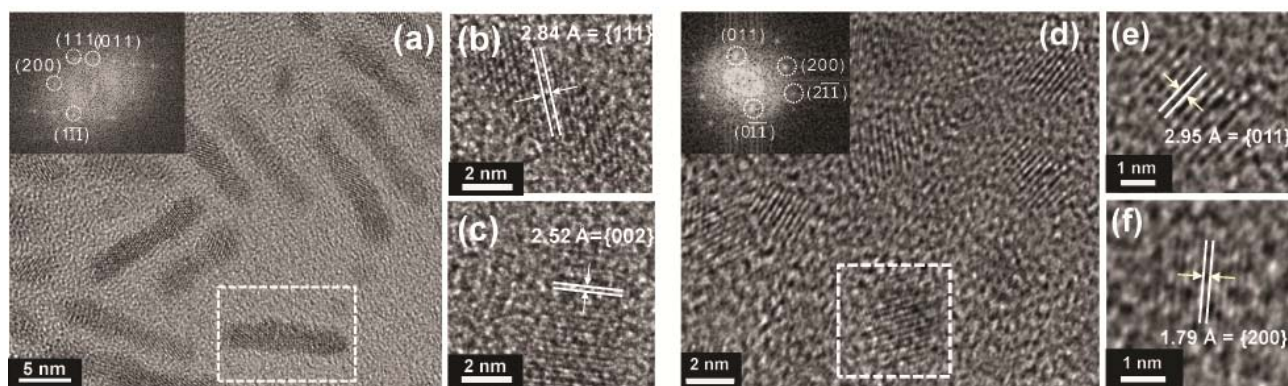
### Synthesis of 7,7,8,8,9,9,10,10,11,11,12,12,13,13,14,14,14-heptafluoro-tetradecanoic acid



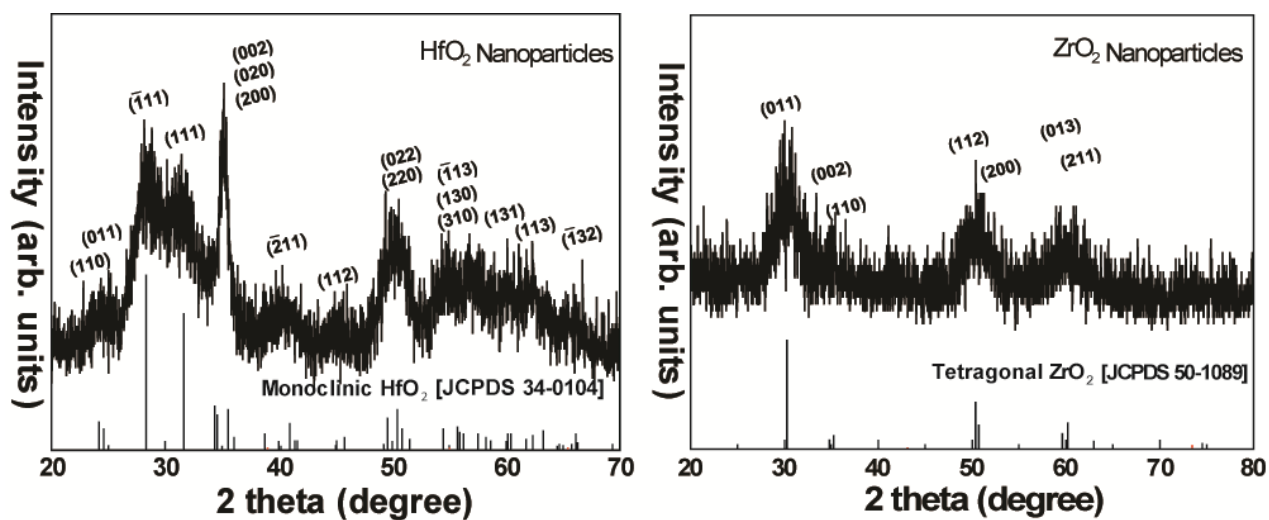
2-(5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-Heptafluorododecyl)malonic acid<sup>1</sup> (0.5 g) was completely dissolved in DMF and the resulting solution was refluxed at 190 °C for 1 hour. The reaction mixture was then distilled under reduced pressure to remove DMF. The concentrate was diluted with CHCl<sub>3</sub> and the insoluble starting material was filtered off. Activated carbon powder was added to the CHCl<sub>3</sub> solution and stirred for 10 min. After removing the activated carbon by filtration, the filtrate was concentrated under reduced pressure. The concentrate was placed in freezer to crystallize the carboxylic acid **3**, which was obtained as a brown solid; <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>, δ) 2.37 (t, 2H, *J* = 7.2 Hz, CH<sub>2</sub>COOH), 1.68 (m, 2H, CH<sub>2</sub>CH<sub>2</sub>COOH), 1.43 (m, 2H, CF<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>), 1.61 (m, 2H, CF<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>), 2.05 (m, 2H, CF<sub>2</sub>CH<sub>2</sub>). δ<sub>H</sub> data is in agreement with literature values.<sup>2</sup>



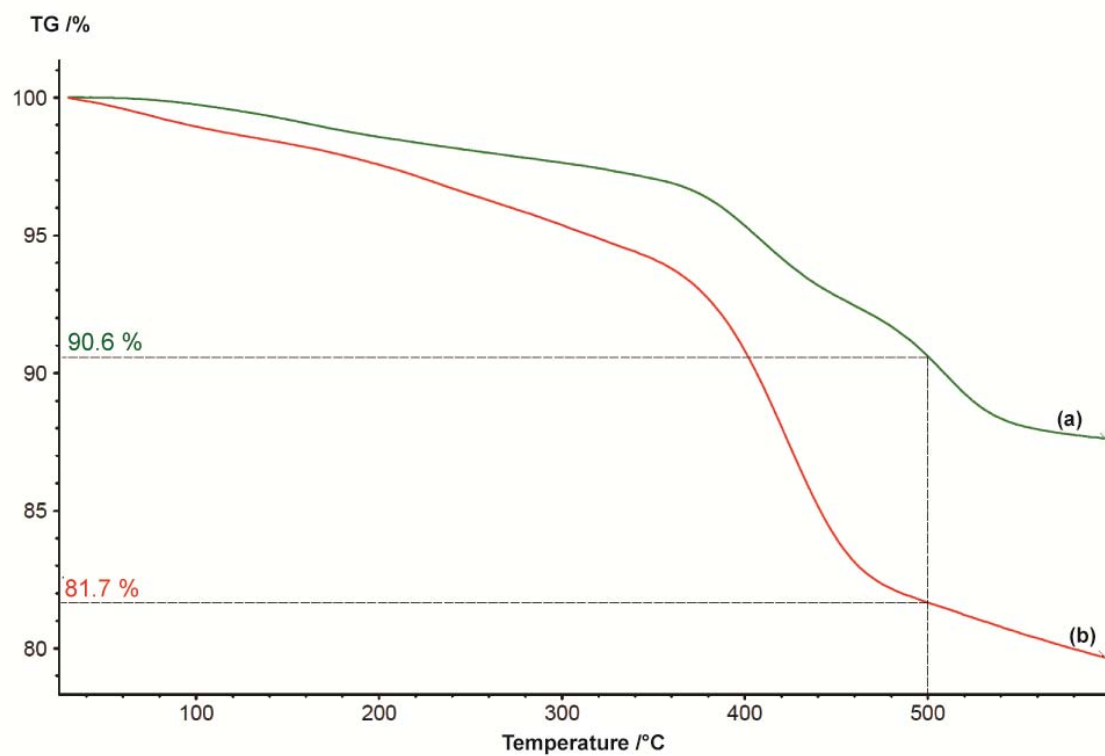
**Figure S1.** Synthesis of (a) tri-*n*-octylphosphine oxide (TOPO) stabilised HfO<sub>2</sub> (**1**) and (b) ZrO<sub>2</sub> nanoparticles (**2**)



**Figure S2.** Low-magnification transmission electron microscopy (TEM) images of (a) TOPO-stabilised  $\text{HfO}_2$  nanorods (**1**) and (b)  $\text{ZrO}_2$  nanospheres (**2**) on carbon-coated copper grid [Inset images in (a) and (d) are Fast Fourier Transform (FFT) patterns of the selected regions shown as dotted boxes]. (b-c) and (e-f) Close-up views of high resolution TEM (HRTEM) images of  $\text{HfO}_2$  and  $\text{ZrO}_2$  lattices.



**Figure S3.** X-ray diffraction patterns of TOPO-stabilised  $\text{HfO}_2$  nanorods (**1**) and TOPO-stabilised  $\text{ZrO}_2$  nanospheres (**2**).



**Figure S4.** Thermogravimetric analysis of (a) TOPO-stabilised HfO<sub>2</sub> (**1**) and (b) TOPO-stabilised ZrO<sub>2</sub> (**2**).

## References

- (1) Tra Anh, D.; Blancou, H.; Commeyras, A. *J. Fluorine Chem.* **1999**, *96*, 167.
- (2) Ober, C. K.; Wang, J.; Kramer, E. J.; Google Patents: 1999.