Supporting Information

Macroscopic high density nano disc arrays of Zinc oxide fabricated by block copolymer self-assembly assisted nanoimprint lithography

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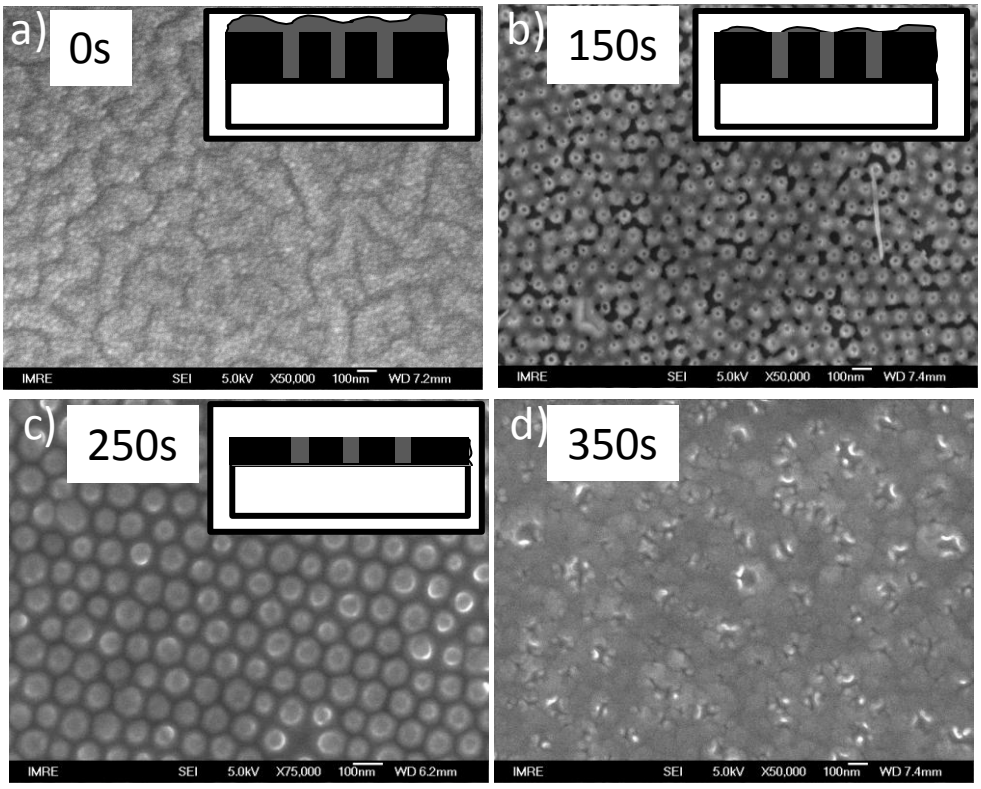

Figure S1. (a-d) Field emission Scanning Electron Microscopy measurements on samples with ZnO coated nanoporous PMMA templates exposed to different durations of Ar ion-beam milling process show 250s to be most optimal in producing well-isolated ZnO nanostructures. Representative schematics of the evolution of the surface morphology are shown as inset. At 350s, the substrate appeared over etched, resulting in no recognizable features

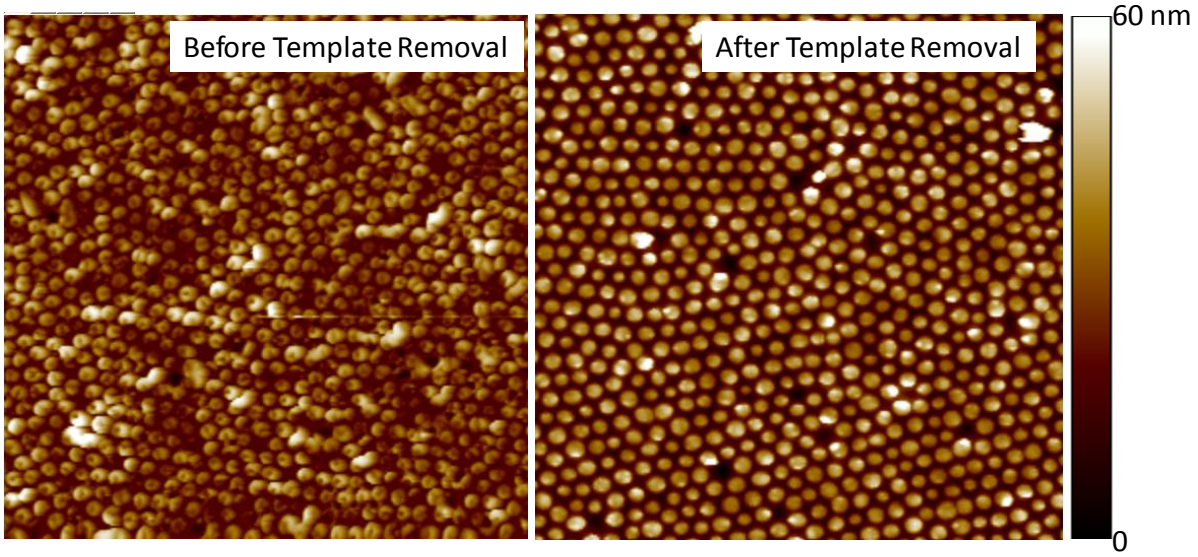

Figure S2. Tapping mode AFM measurements on ZnO coated nanoporous PMMA template subjected to 250s of Ar ion milling, (left) before and (b) after removal of the PMMA templates

Element	Peak Area	Area Sigma	k factor	Abs Corrn.	Weight %	Weight % Sigma	Atomic %
O K	14615	223	1.309	1.000	7.63	0.12	25.24
Zn K	60418	414	3.832	1.000	92.37	0.12	74.76
Totals					100.00		

Figure S3. Composition of the ZnO features as analyzed through a localized EDX

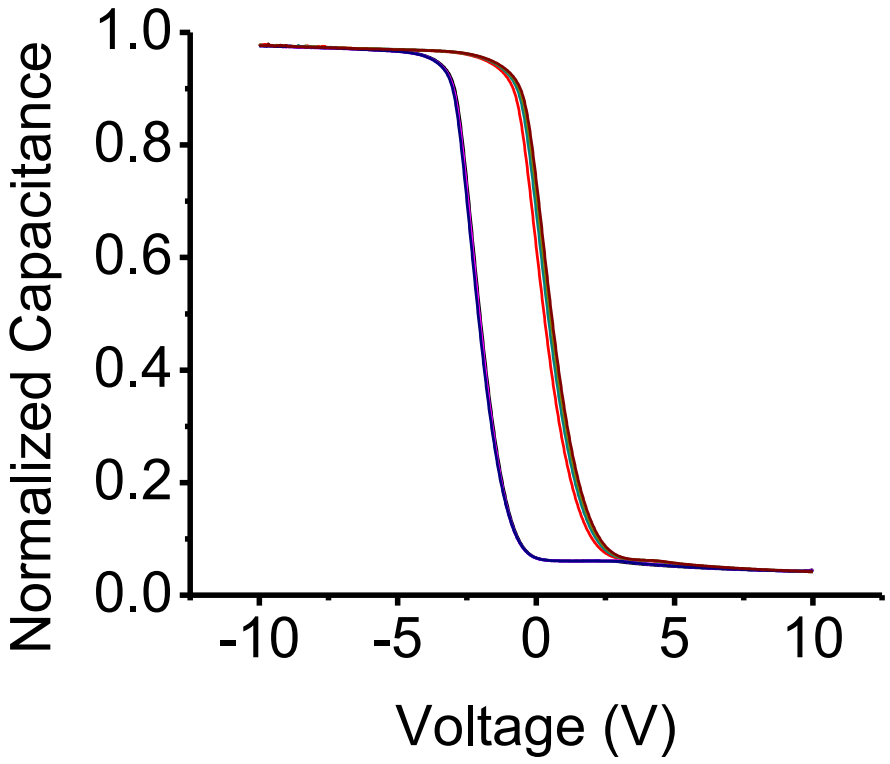

Figure S4. Demonstrates the capability of our device to be erased and reprogrammed for multiple (5) cycles while maintaining the large memory window after each cycle as shown.

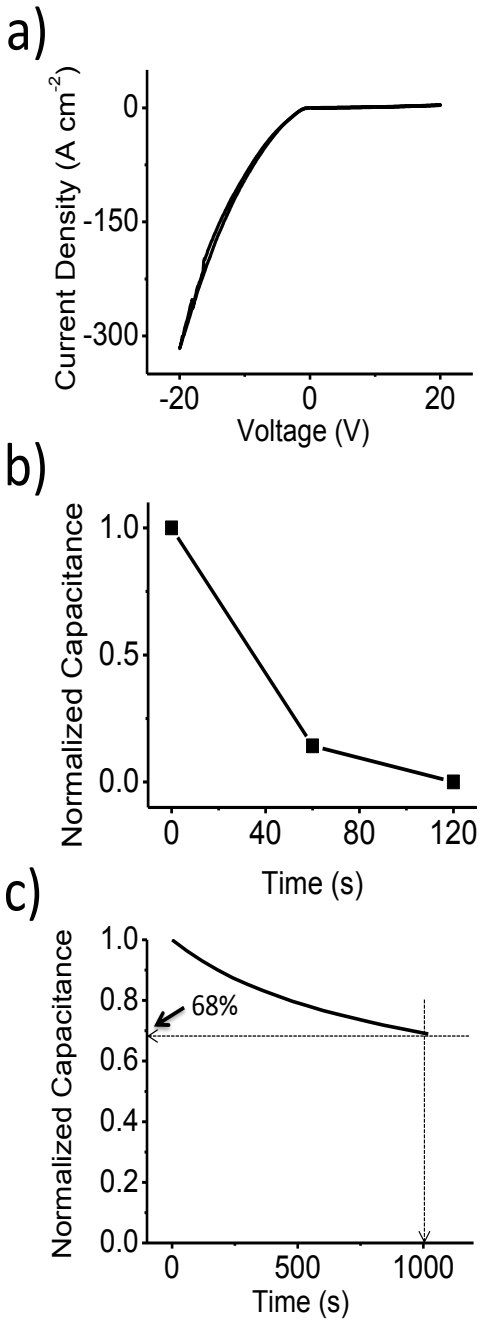

Figure S5. a) Current-Voltage (I-V) and b) Capacitance-time characteristics measured with Voltage held at +10V, of the MOS capacitor device incorporating ZnO nano disc arrays and 3 nm thermally grown SiO_2 as tunneling oxide layer. c) Capacitance-time plots for Voltage held at -10V for the MOS capacitor device incorporating ZnO nano disc arrays with the native SiO2 tunneling oxide layer

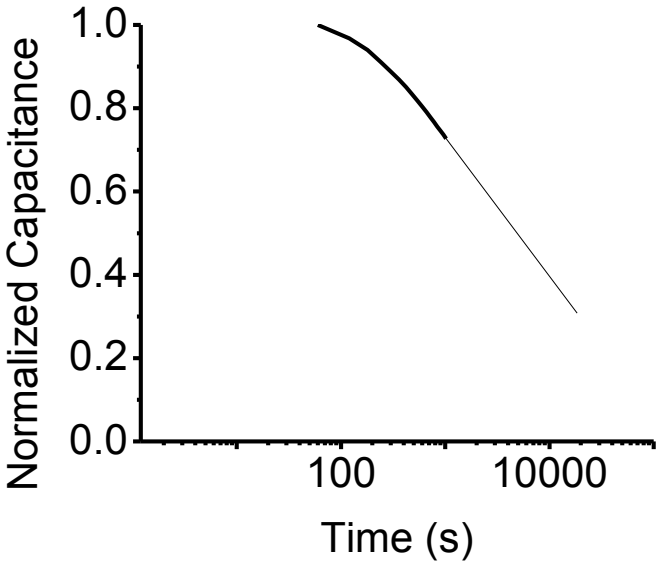

Figure S6. The C-t graph after extrapolating upto 10000s, shows that ~50 % of the charge is retained. It is observed from the graph that the charges leak with time but it happens at a very slow rate since charges stored in shallow trap states would typically leak first. In practice, the charges trapped in deep trap states would be more resilient to leakage (Lin et al., Electrochem and solid state lett, 2010; WH Choi et al., Japanese Journal of applied Physics, 2009).