High voltage energy storage

J. M. Lim, Y. S. Jang, H. Van T. Nguyen, J. S. Kim, Y. Yoon, B. J. Park, D. H. Seo, K. Lee, Z. Han, K. (. Ostrikov and S. G. Doo, Nanoscale Adv., 2023,5, 615 DOI: 10.1039/D2NA00863G

S.S.C, N.S., S.S. and S.-L.H. have filed a US provisional patent (No. 63/625,727) through the University of California, Berkeley (Disclosure BK-2024-082) titled "Giant Energy and Power Density Microcapacitors via Ferroic Order Superlattices".

The energy storage density in HZO thin films was optimized through a three-pronged approach: (i) field-driven NC optimization through ferroic phase engineering in ~10 nm films (left), (ii) scaling up the field-driven NC behavior to ~100 nm through amorphous-templated superlattices (lower right), and (iii) integration of NC superlattices into 3D Si capacitors to increase the energy storage density per footprint area (upper right).

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