Supplementary Information for

Artificial Optoelectronic Synapses Based on Organic-inorganic Hybrid Perovskite Ferroelectrics for Reservoir Computing

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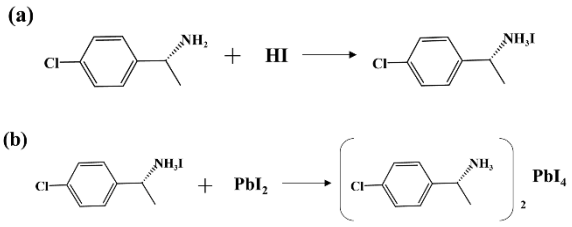


Figure S1. (a) Reaction equation for the synthesis of RI. (b) Reaction equation for the synthesis of [R-1-(4-chlorophenyl)ethylammonium]$_2$PbI$_4$.

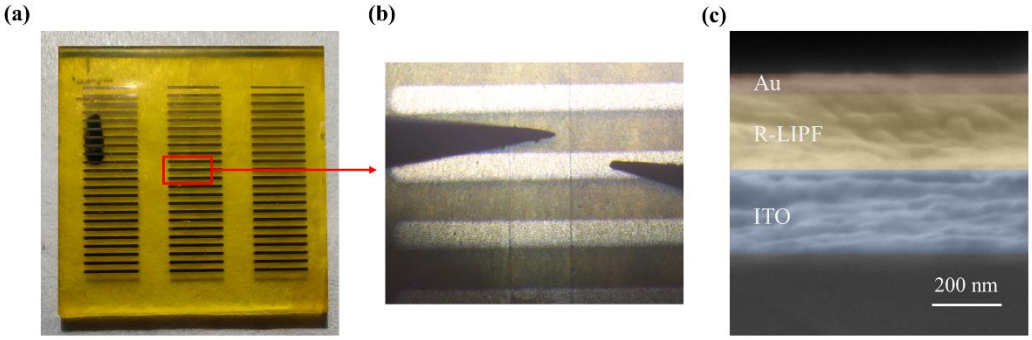


Figure S2. (a) Optical image of the fabricated device. (b) Optical microscope image of the device at 2× magnification. (c) Cross-sectional SEM image of the device showing the layer structure.

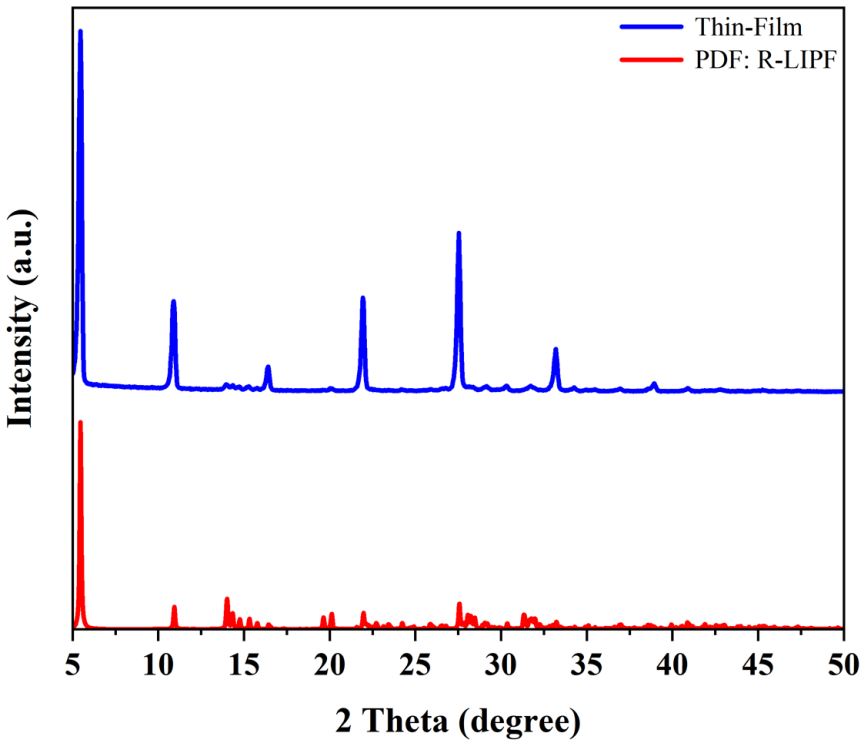


Figure S3. The XRD pattern of R-LIPF matches the PDF card well. The PDF card was calculated from crystallographic data (CCDC 1885085).

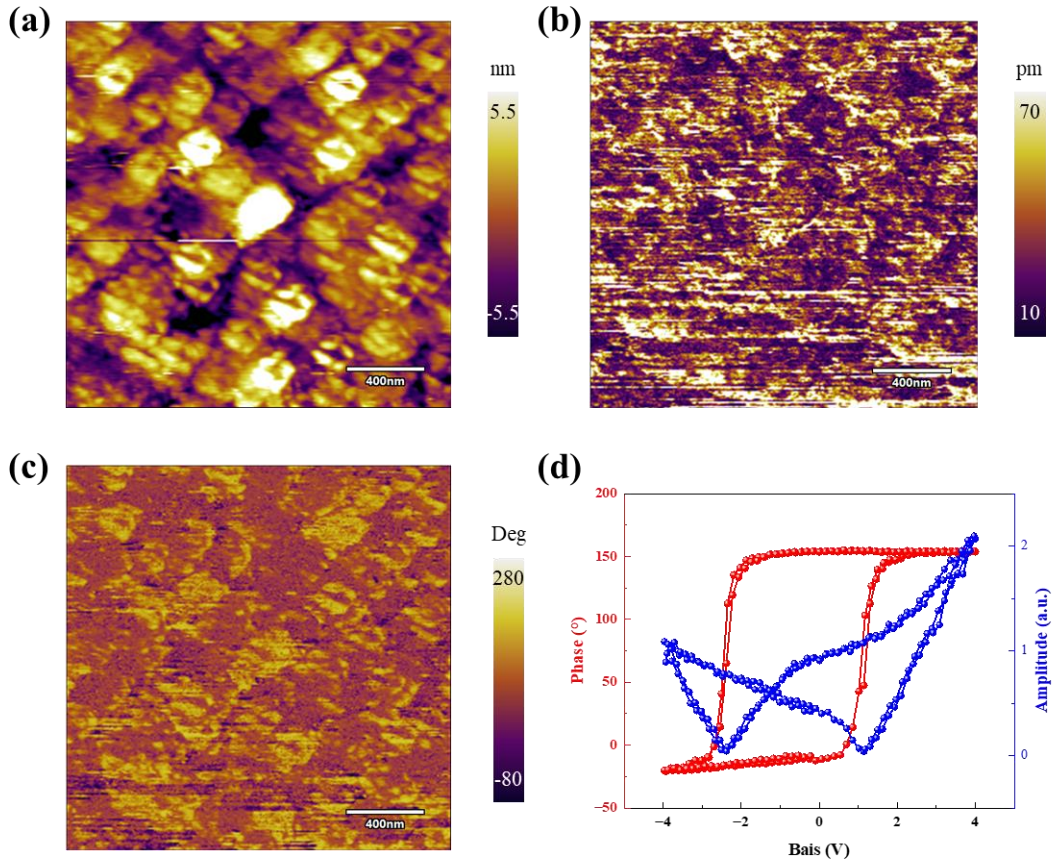


Figure S4. PFM characterization. (a) Topography, (b) PFM amplitude, (c) PFM phase images and (d) the local piezoelectric hysteresis loops of R-LIPF film. Scale bar, 400 nm.

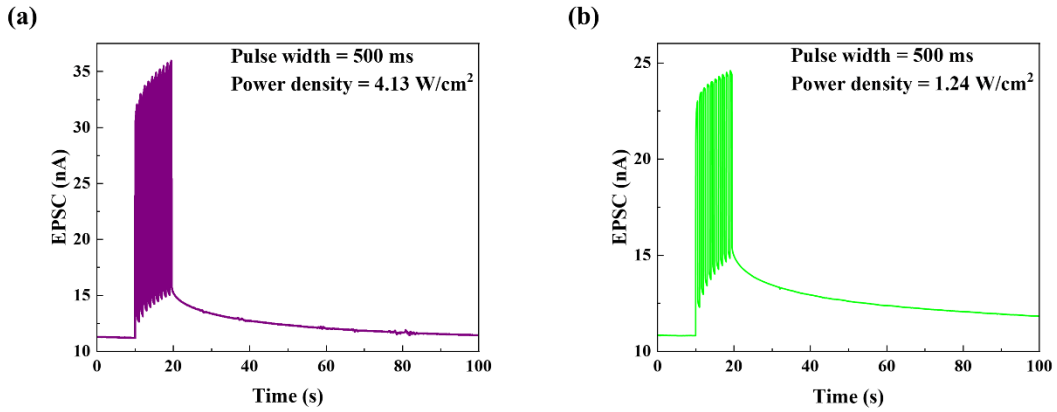
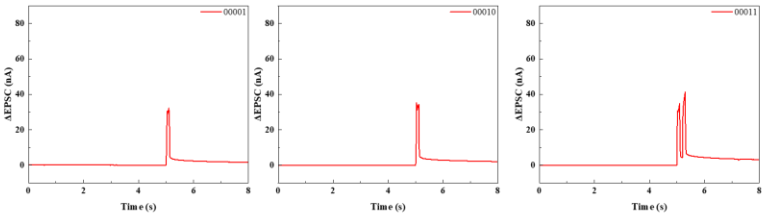
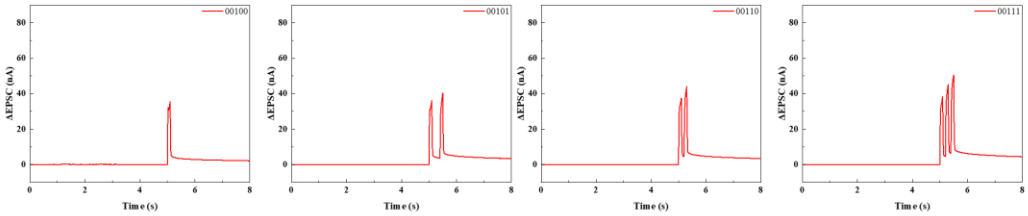
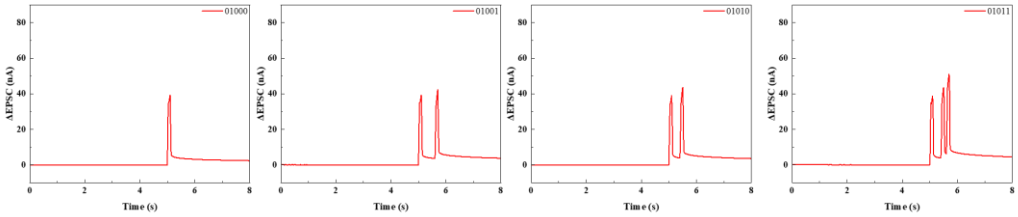
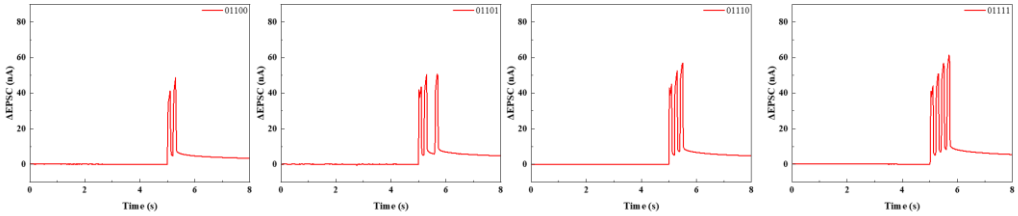


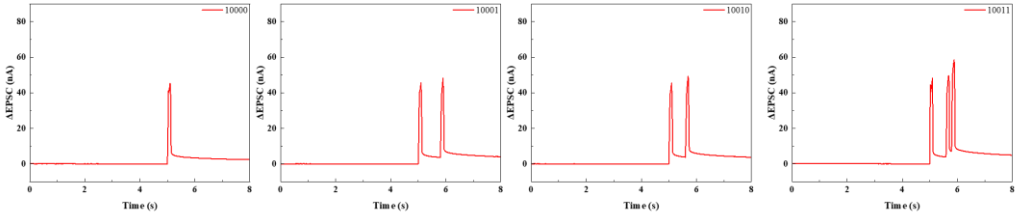
Figure S5. Variation of EPSC with time under stimulation with different wavelengths. (a) 405 nm, (b) 520 nm. The measurements were performed under a bias voltage of 0.1 V, with light pulses at a frequency of 1 Hz and a duration of 500 ms.

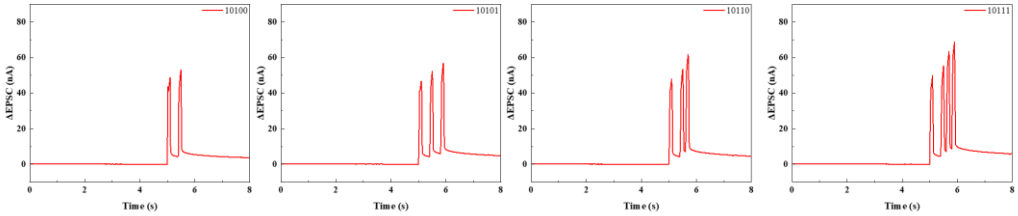

00001
00010
00011
ΔEPSC (nA)
Time (s)


00100
00101
00110
00111
ΔEPSC (nA)
Time (s)


01000
01001
01010
01011
ΔEPSC (nA)
Time (s)


01100
01101
01110
01111
ΔEPSC (nA)
Time (s)


10000
10001
10010
10011
ΔEPSC (nA)
Time (s)


10100
10101
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ΔEPSC (nA)
Time (s)

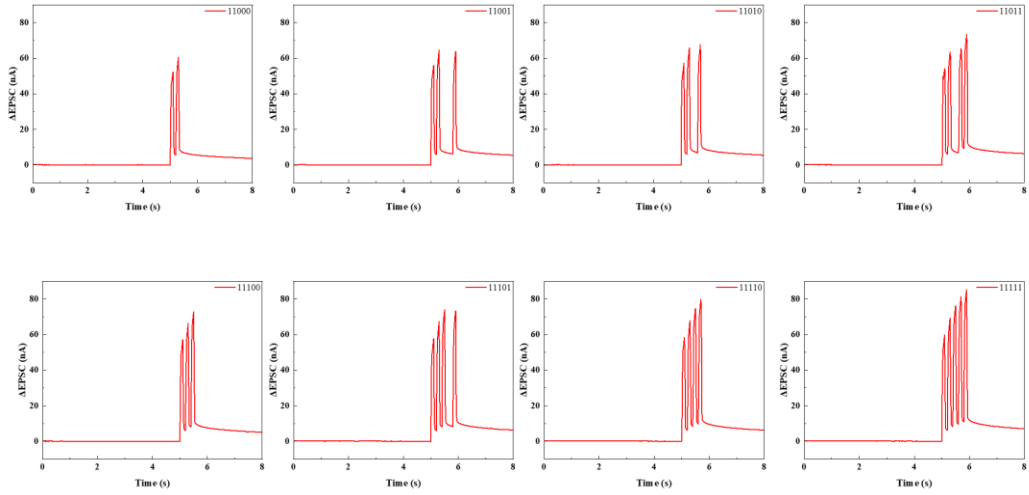

Figure S6. Response current for one device from (00000) to (11111) 32 pulses.