Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

High-Performance Perovskite Memristor Based on Methyl Ammonium Lead Halides

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I-V characteristics of the device with an inert metal electrode

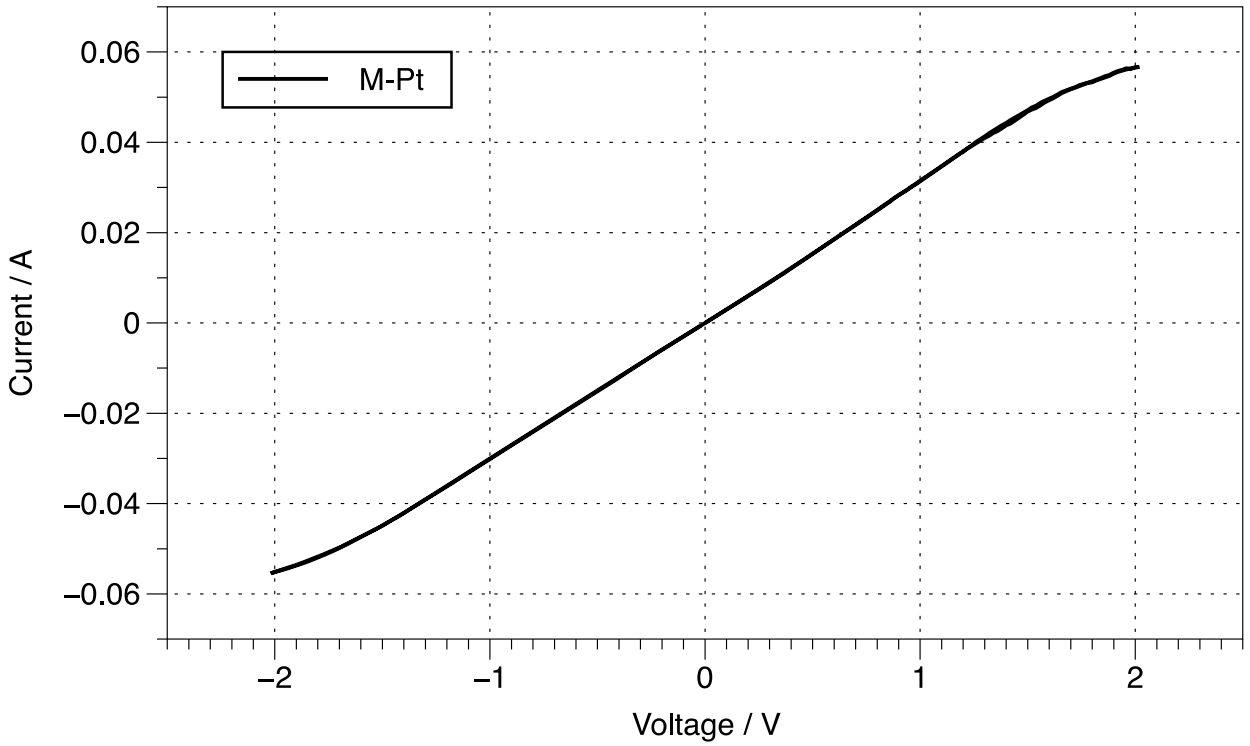


Figure S1. *I-V* characteristics test of FTO/$CH_3NH_3PbCl_XI_{1-X}$/Pt device.

Log-scale version of the *I-V* characteristics of devices with different active metals

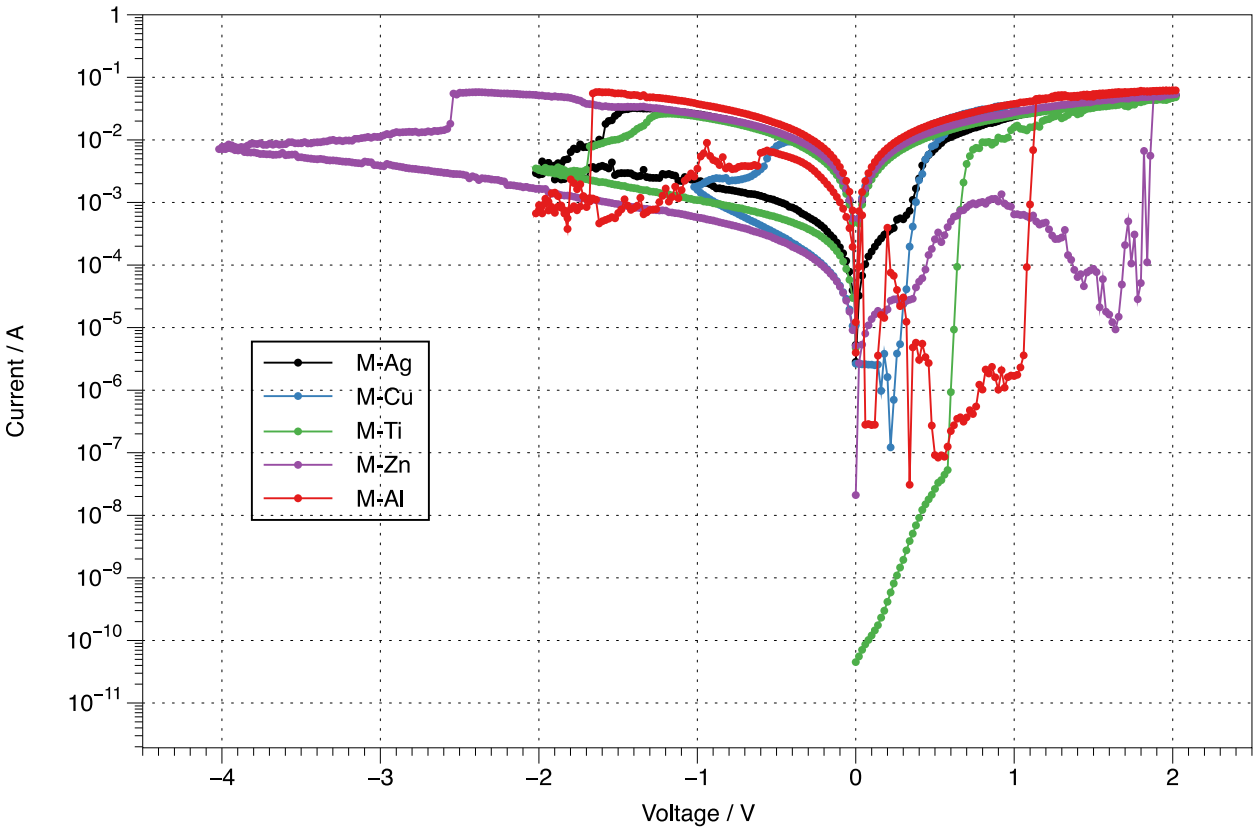


Figure S2. *I-V* characteristics of FTO/$CH_3NH_3PbCl_XI_{1-X}$/Ag (M-Ag), FTO/$CH_3NH_3PbCl_XI_{1-X}$/Cu (M-Cu), FTO/$CH_3NH_3PbCl_XI_{1-X}$/Ti (M-Ti), FTO/$CH_3NH_3PbCl_XI_{1-X}$/Zn (M-Zn) and FTO/$CH_3NH_3PbCl_XI_{1-X}$/Al (M-Al).

Log-scale version of the *I-V* characteristics of the device with TiO_2 compact layer

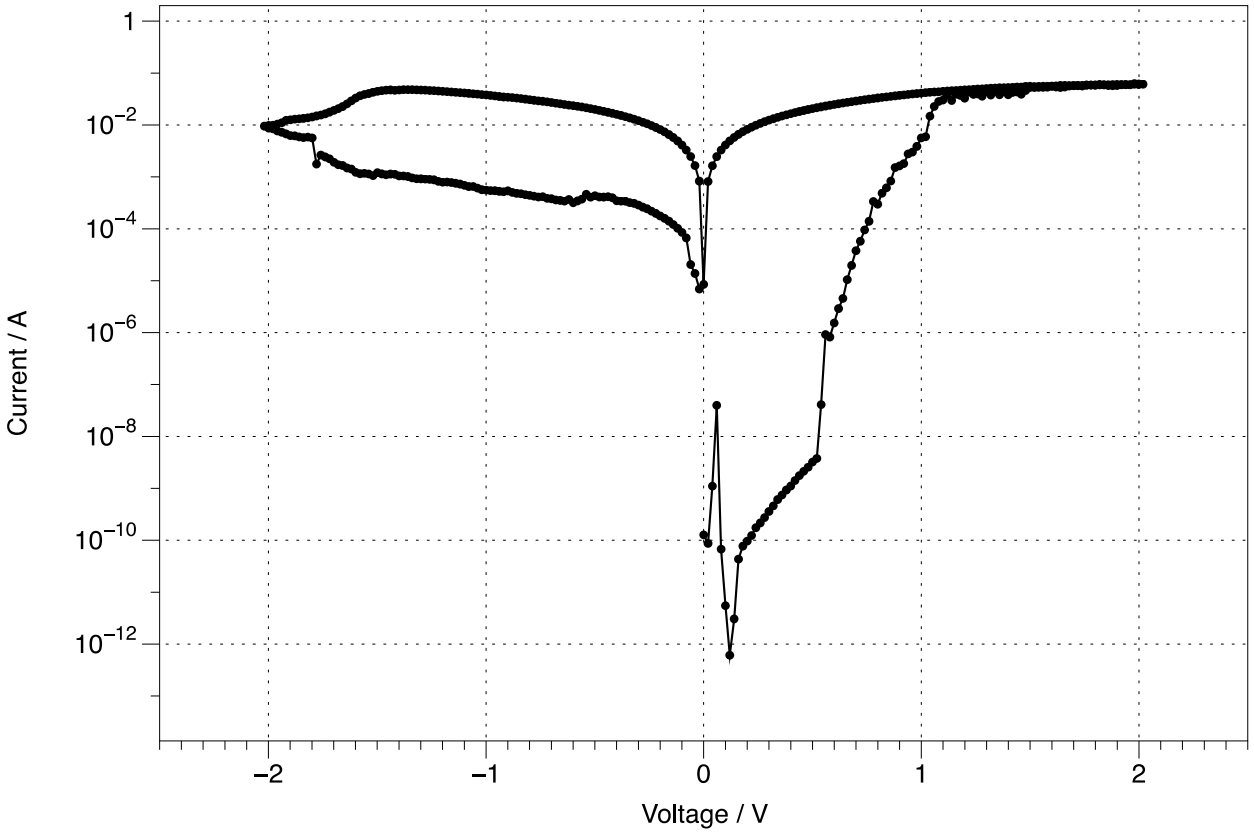


Figure S3. *I-V* characteristics of FTO/TiO_2 compact layer/$CH_3NH_3PbCl_XI_{1-X}$/Al.

Memristive property of TiO_2 compact layer

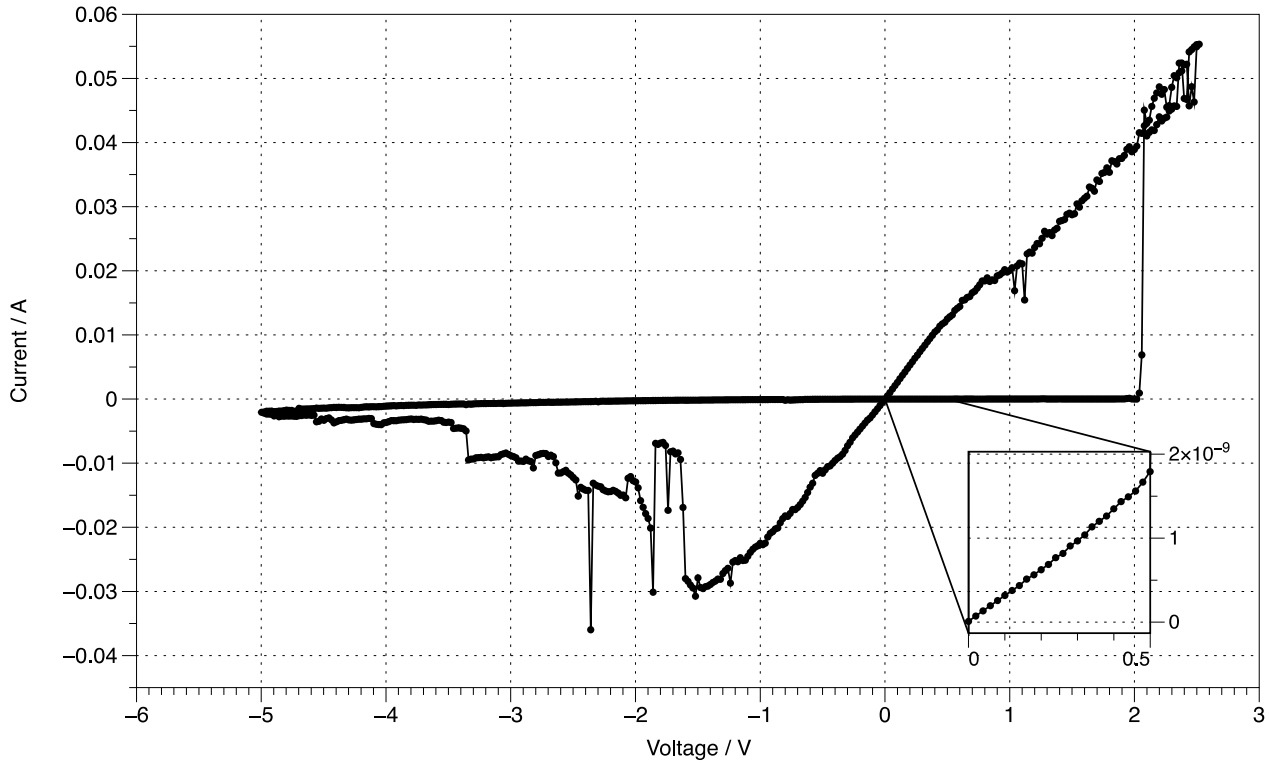
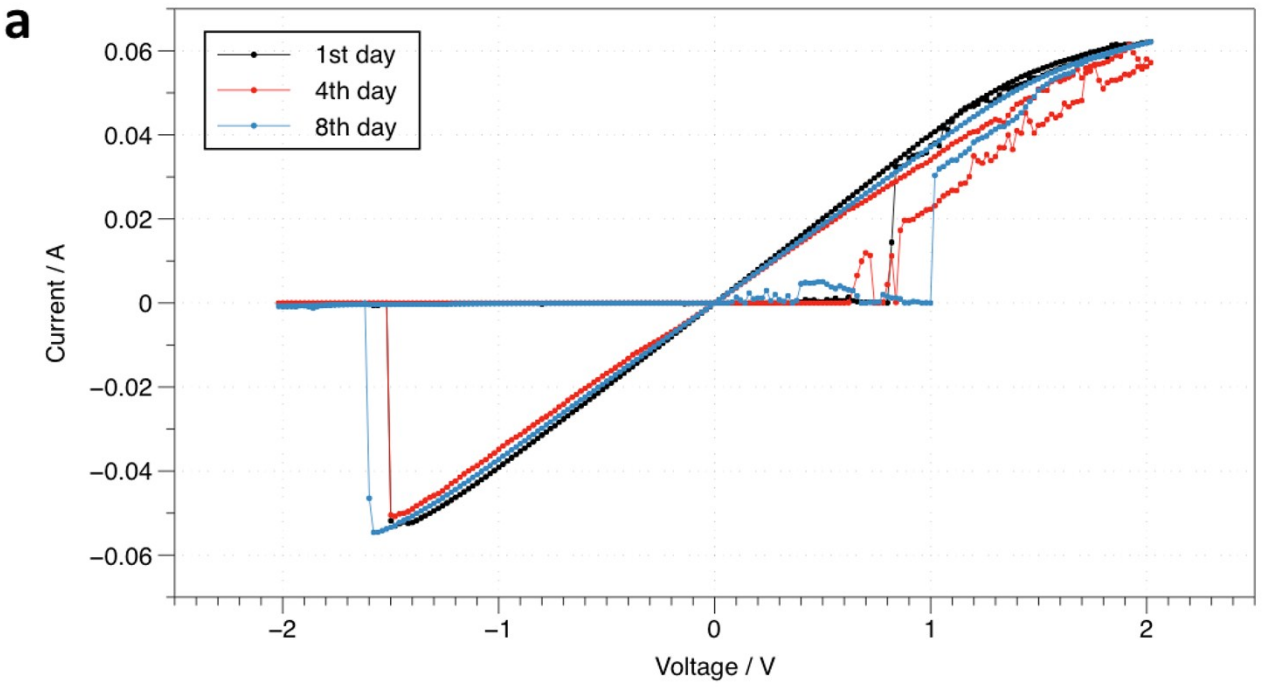
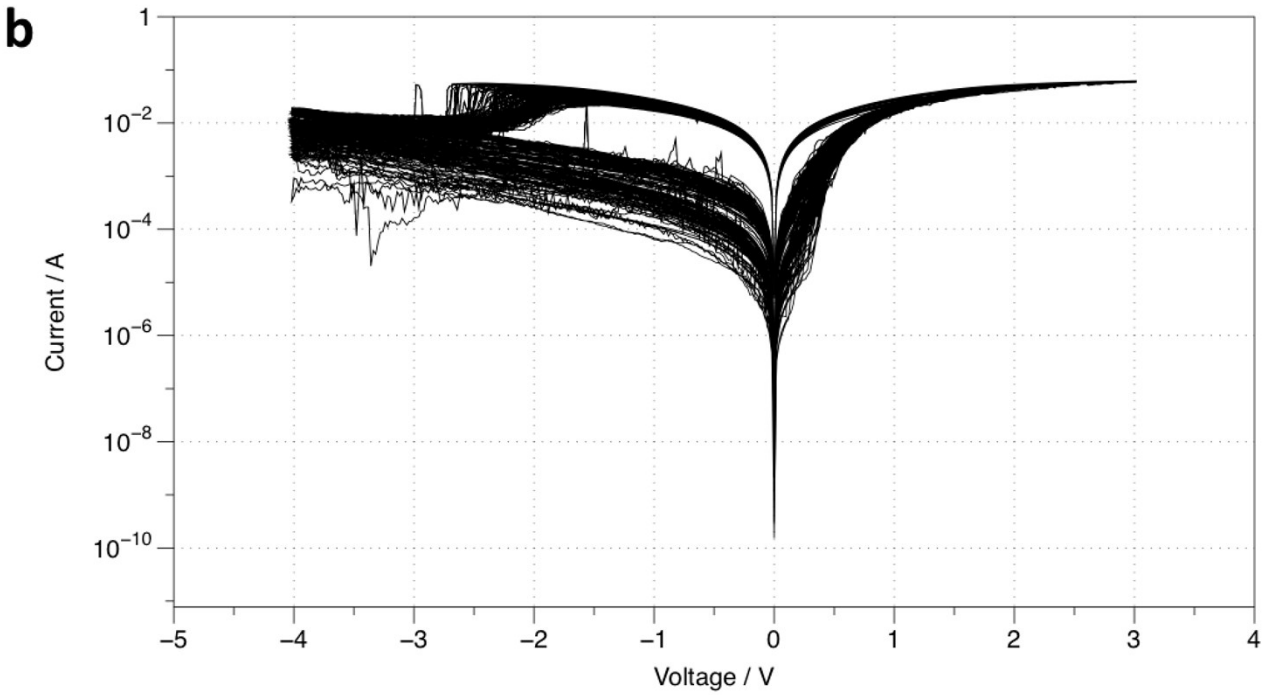


Figure S4. *I-V* characteristics of FTO/TiO_2 compact layer/Al.

Device stabilite tests





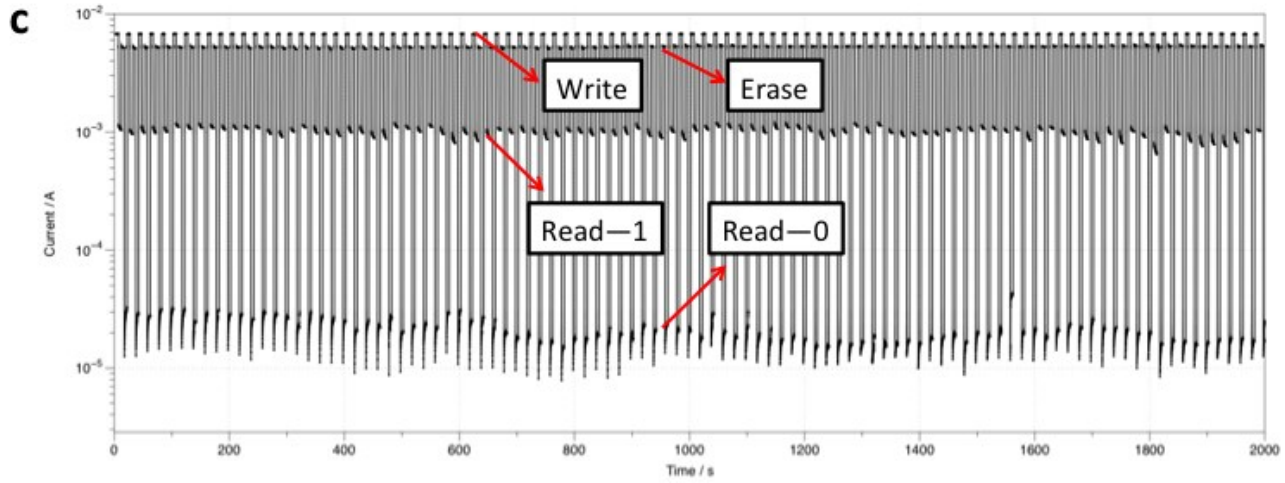


Figure S5. Device stability of FTO/$CH_3NH_3PbCl_XI_{1-X}$ /Al measured by **a** long-interval *I-V* characteristics tests, **b** consecutive *I-V* characteristics test (160 times) and **c** pulse-voltage test (write-2V/5s, erase-5V/5s, read-0.05V/5s; 100 times). The device was kept and tested in air without any protection.

Thickness of the perovskite layer

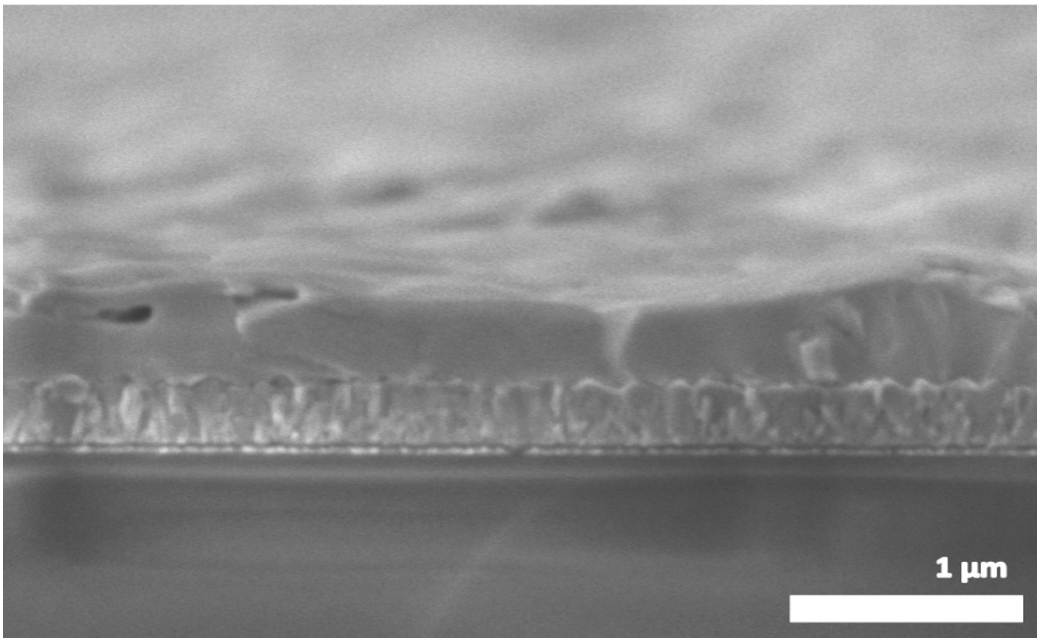


Figure S6. Cross-sectional SEM image of FTO/$CH_3NH_3PbCl_XI_{1-X}$.

The dependence of the on-state resistance on the area of active metal electrode

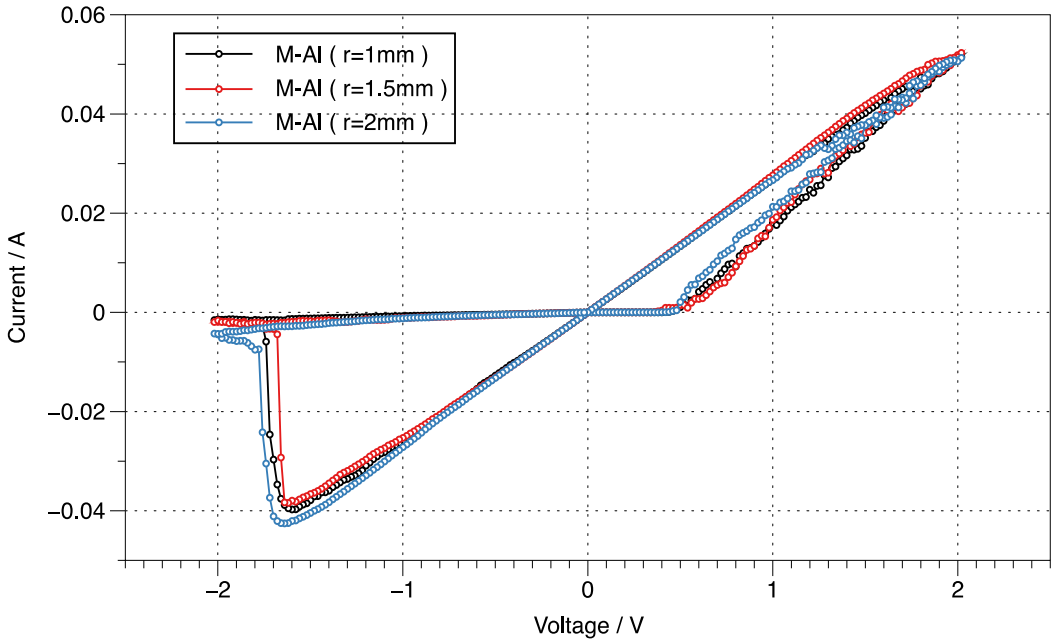


Figure S7. *I-V* characteristics of FTO/$CH_3NH_3PbCl_XI_{1-X}$/Al with varying areas of Al electrode.