

Modeling Anomalous Hysteresis in Hybrid Perovskite with Space Charge Limited Currents

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We investigate the use of a space charge limited current theory to calculate the current-voltage curve in hybrid perovskite materials (such as $\text{CH}_3\text{NH}_3\text{PbI}_3$) which exhibit hysteresis. A very simple 2D model is constructed, whereby two hybrid perovskite grains lie between two parallel electrodes, and the boundary between the grains lie traverse from one electrode to the other. Confined within the grain boundary, exists halide ions which can move freely and distribute themselves accordingly in the presence of an external potential. The polarization of the material is taken into account using bound charge along the edges of the system. Using this model, we calculate the current-voltage curve and compare with experimental results.