**Semimetallicity and Negative Differential Resistance from Hybrid Halide Perovskite Nanowires**

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In the rapidly progressing research on organometal halide perovskites, the dimensional reduction could open up new venues to improve material properties and introduce additional functionalities. Herein, carrying out first-principles calculations, we consider the nanostructuring and device applications of the recently synthesized trimethylsulfonium lead triiodide (CH3)3SPbI3 perovskite. We find that the one-dimensional (1D) (CH3)3SPbI3 structure is energetically and dynamically stable, and the electronic structures of higher-dimensional forms are robustly determined at the 1D level. Upon removing organic ligands, the 1D PbI­3 column consisting of face-sharing [PbI­6] octahedra is also found to be structurally stable and, more interestingly, have a semi-metallic character, contradicting the conventional assumption of semiconducting metal-halogen inorganic frameworks. Adopting the bundled nanowire junctions consisting of semiconducting (CH3)3SPbI3 channels sandwiched between semi-metallic PbI3 electrodes, we finally obtain a high negative differential resistance (NDR) characteristics. We show that the NDR results from a novel mechanism that involves the quantum-mechanical delocalization of channel electronic states and its disruption with increasing bias voltages. Our work demonstrates the great potential of low-dimensional hybrid perovskites toward advanced electronic devices beyond actively-pursued photonic applications.