Abstract Submitted
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Understanding charge transport in organometal halide field effect transistors.[1] SATYAPRASAD P SENANAYAK, BINGYAN YANG, ADITYA SADHANALA, PROF. SIR RICHARD FRIEND, PROF. HENNING SIRRNIGHAUS, Optoelectronics Group, Cavendish Laboratory, University of Cambridge — Organometal halide based perovskite are emerging materials for wide range of electronic applications. A range of optoelectronic applications like high efficiency solar cells, color pure LEDs and optical pumped lasers have been demonstrated. Here, we report the demonstration of a high performance field effect transistor fabricated from iodide perovskite material at room temperature. The devices exhibit clean saturation behavior with electron μ_{FET} >3 $\mathrm{cm^2V^{-1}s^{-1}}$ and current modulation in the range of 10^6 – 10^7 which are till date the best performance achieved with these class of materials. This high performance is attributed to a combination of novel film fabrication technique and device engineering strategies. Detailed understanding of the observed band-like transport phenomenon is developed by tuning the different sources of dynamic and static disorder prevalent in the system. These finding are expected to pave way for developing next generation electronic application from perovskite materials.

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