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Carbon Nanotube Charge Collectors in Doped Hybrid Perovskite Solar Cells ZANE OLDS[1], ROSS HAROLDSON[2], KAMIL MIELCZAREK, ANVAR ZAKHIDOV[3], Univ of Texas - Dallas — Hybrid organo-metallic solar cells based on perovskite crystals have had steadily improved power conversion efficiencies over the past two years, and within this period have achieved efficiencies over 19%. We show that additions of Metal-Halide dopants, such as Cobalt (II) Iodide or Indium and Bismuth materials, can cause substitutional doping at the Lead atom. This may result in structural distortions (as in isovalent Co-doping) within the lattice causing change in the spatial distribution of charge carriers. We show that Co-doping results in an increased open circuit voltage upon light soaking due to possible higher charge accumulation. We also have investigated effects of p-doping the hole transport layer. We also incorporate composite sheets of MW carbon nanotubes and silver nanowires as charge collectors. These sheets provide a transparent and flexible electrode with lower sheet resistance due to integration of Ag nanowires. This has an effect on the work function of the sheet, making it more versatile as an electrode for use in a variety of device structures. This allows us a semi-transparent perovskite device, where incident light can be absorbed from either side of the device. This is beneficial towards achieving multi-junction perovskite solar cells.

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