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Perovskite Devices Stability? Effect of Ruddleson Popper Perovskites with Liquid Crystal Based Novel Hole Transporters[1] QURAT UL AIN, MOHSIN RAZA, SHAHZAD AKHTAR ALI, AMMAR AHMED KHAN, Lahore University of Management Science Pakistan, SYED BABER ALI SCHOOL OF SCIENCE AND ENGINEERING TEAM — Among the emerging photovoltaic (PV) devices, Perovskite solar cell (PSC) devices are essential due to their competitive efficiencies, easy processing with a flexible structure, and less cost. These devices are not yet in commercial use due to their unavoidable instabilities under humidity and thermal effects. Therefore, we aim to make stable PSC devices by using multi-dimensional perovskite along with the mesogens discotic liquid crystals-based hole transport layers(HTLs). We investigated the optoelectronics properties of Butyl, octyl, and phenethyl-ammonium iodide incorporated RP phased perovskite structures with a specific left shift in bandgap and photoluminescence peaks. Mesogenic HTLs have promising self-assembled characteristics in terms of stability, cost, core size, and hole mobility with favorable conduction along the columnar axis. We compared their conduction characteristics with commercial HTLs with the help of UV-Vis, conductivity measurements, and SEM analysis. Finally, PSCs devices were tested for external quantum efficiency and photovoltaic performance. Hence we checked how device efficiency and the lifetime effected by increasing the hydrophobic character of its material layers. And through contributing to this research, we find a novel aspect to emerging PVs.

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