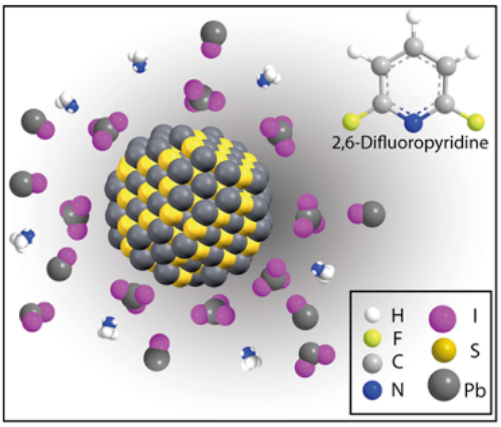
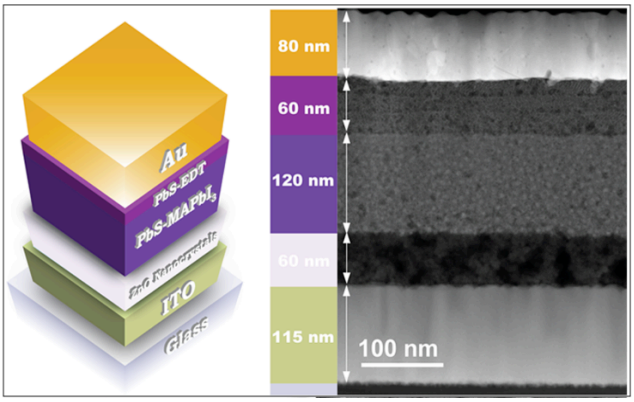
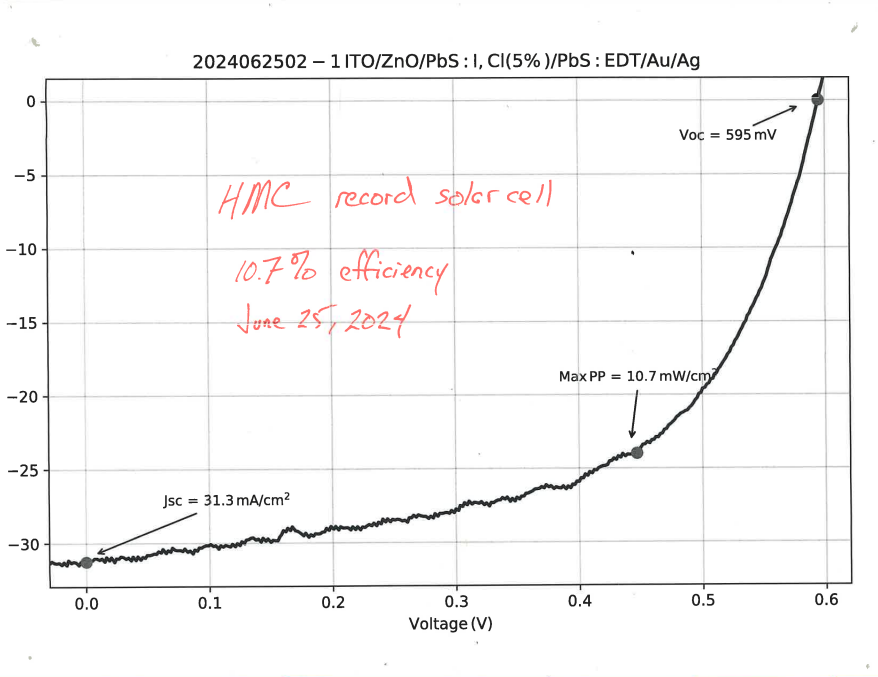
Quantum Dot-Based Photovoltaics:



A schematic of a lead iodine/methyl ammonium lead iodide perovskite core/shell quantum dot suspended in 2,6-difluoropyridine, creating an ink that can be printed on surfaces to create photovoltaic cells. These quantum dots are roughly 3.2 nm in diameter.



A schematic and a cross-sectional scanning electron micrograph of a bulk layer heterojunction quantum dot solar cell. The photoactive layer of 3.2 nm-diameter PbS quantum dots coated in methylammonium lead iodide perovskite (colored deep purple) is sandwiched between a ZnO electron transport layer and an ethanedithiol-clad PbS quantum dot hole transport layer. The overall thickness of the device is 435 nm, which is 100 times thinner than a layer of latex paint, and roughly 200 times thinner than the diameter of an average human hair.



Current-voltage (power) curve showing current density (mA cm^{-2}) as a function of applied voltage for a quantum dot solar cell employing lead sulfide quantum dots capped with lead iodide and lead chloride. The cell is 10.7% efficient in converting optical to electrical power.