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Room-temperature composite transparent electrodes for solution-processed solar cells[1] GARY QIAN, Johns Hopkins Univ, BOTONG QIU COLLABORATION, EBUKA ARINZE COLLABORATION, YIDA LIN COLLABORATION, NATHAN PALMQUIST COLLABORATION, SUSANNA THON COLLABORATION — Colloidal quantum dots (CQDs) are promising materials for semi-transparent solar cells due to their infrared responsivity and ability to be flexibly coated on a variety of substrates. One limiting factor in the creation of high-performing semi-transparent CQD solar cells is the top transparent contact. Existing contact materials include indium tin oxide (ITO), which suffers from fragility, cost, and manufacturing difficulties; specifically, the ability to be processed at the low temperatures compatible with the underlying CQD films. Solution-processed silver nanowires (AgNWs) are a possible alternative but have not achieved the conductivity of the best-performing transparent conductors to date. We develop a novel, room-temperature, all-solution-processed transparent conductor composed of AgNWs and colloidal ITO nanoparticles with conductivity rivaling the best high temperature alternatives. We discuss characterization results and the integration of our new top contact into a CQD solar cell device.

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