A solution process for inverted tandem solar cells

Tandem solar cells with normal and inverted device geometries were prepared by a solution process. Both device types were based on the use of zinc(II)oxide as the electron transporting layer (ETL). The hole transporting layer (HTL) was either PEDOT:PSS for normal geometry tandem solar cells or vanadium(V)oxide in the case of inverted tandem cells. It was found that the inverted tandem solar cells performed comparable or better than the normal geometry devices, showing that the connection structure of vanadium(V)oxide, Ag nanoparticles and zinc(II)oxide functions both as a good recombination layer, ensuring serial connection, and as a solvent barrier, protecting the first photoactive layer from processing of the second layer. This successfully demonstrates a tandem solar cell fabrication process fully compatible with state-of-the-art solution based automated production procedures.

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