Surface passivation of TiO_2-nanoparticles for efficient triple-cation perovskite solar cells

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Motivation:

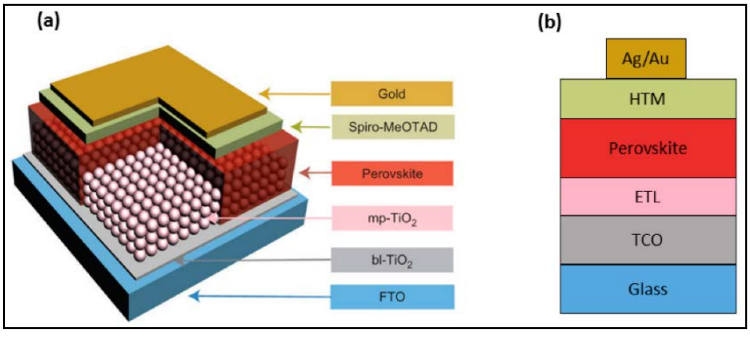
In a perovskite solar cell, an electron charge selective layer (ETL) is considered one of the important components that are widely studied and explored. A care of choice to employ this ETL could block holes and allows only electrons to pass through it. However, the interface between the ETL and perovskite is reported to be a recombination site for charge carrier, thereby lowering overall device performance. To overcome this, modifying an ETL by using TiO_2- nanoparticles with surface/interface passivation is of interest. This is due to the fact that a transport length of the charge carrier in the TiO_2- nanoparticles is relatively longer than that of TiO_2 in a thin film [1].

Objectives:

1. Synthesize TiO_2- nanoparticles solution by following the Lukas's paper [2].
2. Passivate the TiO_2 surface/interface.
3. Prepare triple cation perovskite onto the passivated TiO_2 charge selective contact layer.

References:

1. J. Hua, W. H. Liu, Y. P. Yang, L. Zhao, Y. Qiao, S. H. Li, P. H. Liu, M. W. Chen, TiO2 nanotube/TiO2 nanoparticle hybrid photoanode for hole-conductor-free perovskite solar cells based on carbon counter electrodes, Optical Materials Express, 2017
2. L. Kegelmann, C. M. Wolff, C. A. Omondi, F. Lang, E. L. Unger, L. Korte, T. Dittrich, D. Neher, B. Rech, S. Albrecht, It takes two tango – double-layer selective contacts in perovskite solar cells for improved device performance and reduced hysteresis, Applied Materials and Interfaces, 2017



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