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Title: Charge effects in thin a-Si films with embedded gold particles

Marcel Di Vece, CIMAINA

Inspired by the Paris Climate Agreement of 2015 we work on improving solar cell efficiency which may contribute to a cleaner environment. We focus on thin film solar cells which need little material and are cheaper to produce. To obtain a high efficiency in these thin film solar cells, novel concepts such as plasmonics and Mie scattering are investigated. In this work we study the interaction of plasmonic gold particles embedded in a-Si layers. The gold particles and thin films are fabricated with a state-of-the-art nanoparticle-thin film magnetron based deposition system. The optical properties as well as the electronic states are characterised by UV-Vis spectroscopy and XPS respectively. Optical simulations, by solving the Maxwell equations time resolved, are used to explain the optical results. Due to a difference in work function between gold and a-Si, the system is complicated and needs a more detailed explanation than previously thought. With this work we contribute to a better understanding of a novel concept approach, involving gold particles, for thin film solar cells.

Reference: [G. Faraone et al. Optical Materials, 75, 204-210, \(2018\)](#)