



Fabrication of back-contact solar cells by microsphere lithography

Z. Umatova^{*}, A. Jumabekov

Nazarbayev University, 53 Kabanbay Batyr Avenue

*E-mail: zarina.umatova@nu.edu.kz

The back contact solar cells are a promising alternative to the traditional sandwich type devices. The most convenient and low cost method to fabricate back-contact solar cell devices is using microsphere lithography [1] as it can be performed without expensive photolithography tools and cleanroom. The self-assembly of polystyrene microbeads [2] was performed on top of APTES (3-Aminopropyl)triethoxysilane functionalized surface of tin oxide layers on conductive glass substrates and deposited with magnetron sputtering. The deposition of microsphere beads on the substrates is achieved via electrostatic attraction forces between positively charged molecular monolayer-functionalized substrate and negatively charged micron-sized polystyrene microbeads with carboxyl surface groups. Resulting back-contact electrodes are used for fabrication of perovskite solar cell devices.

Copper was chosen as a cathode layer in order to adapt existing processes on plastic substrates due to lower oxidation temperatures [3] compared to nickel [4].

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