



Center for Nanoscience and Nanotechnology

Improving the stability of perovskite solar cells by removing methylammonium from the perovskite composition

Mr. Reza Ghayoor Najafabadi

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Abstract

Solar energy is a reliable and renewable energy source and the use of solar cells to convert this energy can play an important role in providing clean and sustainable energy to the world. Among the types of solar cells, di-perovskite solar cells have become a leader in the photovoltaic industry today. In all the different types of di-perovskite solar cells, the issue of stability is one of the important challenges for the commercialization of this generation of diperovskite solar cells. The perovskite layer as a light absorber and hole transporter layer that are used in these cells today, due to their organic structure, are considered among the unstable factors of these cells, which make their use to make modules. has limited The aim of this project is to make stable di-perovskite solar cells by removing methylammonium from the perovskite structure and replacing the organic hole transporter layer with a mineral layer. Pursuing this goal leads to the construction of all-mineral diperovskite solar cells and increasing the stability of the cells' performance, because the two main factors of instability, i.e. the effect of increasing temperature (thermal stresses) and also the chemical instability of the materials, are largely eliminated. will be. In this

project and in order to increase the stability of perovskite solar cells, perovskites based on formamidinium (FA) are considered as a light absorbing layer, which due to the physical structure and narrower energy gap the production of solar cells increases with efficiency and stability. The use of perovskites based on FA requires the stabilization of the optically active phase of these perovskites at room temperature, which is the main focus in this research proposal, providing solutions and using different approaches for making stable perovskite layers are based on FA. In addition to modifying the perovskite layer, the use of mineral hole transporters is one of the decisions taken in this project in order to remove layers based on organic materials and make stable perovskite solar cells.