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Influence of rare earth elements on photovoltaic properties of nanocrystalline silicon thin film solar cells[1] IRINA BARIAKHTAR, M. NAUGHTON, M. BURNS, Boston College, YU. YAKIMENKO, A. IVASHCHUK , V. KOVAL, YU. YASIEVICH , M. DUSHEYKO, National Technical University of Ukraine, KPI, CRDF/SOLAR THECHNOLOGY COLLABORATION — The silicon nanocomposites (nc-Si) with rare earth elements (REE) are the new materials used in optoelectronics. The presence of REE is the cause of the photoluminescence in a silicon nanomaterial and is well studied[1]. However, the introduction of REE impurities into a silicon nanocomposite with the semiconductor matrix (α-Si) appears to be a promising new technology, since such materials can be used in photosensors and thin-film solar cells. It is known that the RE metal impurities can significantly improve transport properties of the material. Such methods have been already used in some solar technologies [2]. Additionally, they can improve photosensitive properties of a material and the REEs with a double valence create the optical impurity centers of a different nature. Finally, some RE ions, e.g. Eu, can effectively absorb UV radiation due to the specific structure of their energy levels [3]. In this presentation, we discuss the influence of the REE on the photovoltaic properties of the nanocrystalline silicon solar cells, their optical characteristics and energy adsorption properties 1. M. Losurdo *et al.,* (2003) *Physica E* **16**, 414. 2. C. Benvenuti, (2013), *Europhysics News* **44** (3), 16. 3. M.M. Mezdrogina *et al.* (2002) *Semiconductors* 36 (11), 1337.

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