Influence of rare earth elements on photovoltaic properties of nanocrystalline silicon thin film solar cells\textsuperscript{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\cite{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 \cite{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 \cite{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 \textsc{I. M. Losurdo et al.}, (2003) \textit{Physica E} \textbf{16}, 414. \textsc{2. C. Benvenuti}, (2013), \textit{Europhysics News} \textbf{44} (3), 16. \textsc{3. M.M. Mezdrogina et al.} (2002) \textit{Semiconductors} \textbf{36} (11), 1337.

\textsuperscript{1}This work is supported in part by the CRDF Grant UKP2-7040-KV-11