Nanocomposites and nanomaterials

**Characterization of TiO2/Cu2O photovoltaic structures on the base of capacitance simulations and measurements**

**G. Wisz1, P. Sawicka-Chudy2\*, R.Yavorskyi3, Z. Zapukhlyak1 , M. Sibiński4,
M. Bester2 , Ł. Głowa1,5 , M. Cholewa2**

*1Department of Experimental Physics, Faculty of Mathematics and Natural Sciences, University of Rzeszow, Pigonia 1 Street, Rzeszow 35-317, Poland.*

*E-mail: email.of.* *corresponding gwisz@ur.edu.pl*

*2Department of Biophysics, Faculty of Mathematics and Natural Sciences, University of Rzeszow, Pigonia 1 Street, Rzeszow 35-317, Poland.*

*3Vasyl Stefanyk PreCarpathian National University, T. Shevchenko, 57, 76-018, Ukraine*

*4Department of Semiconductor and Optoelectronic Devices, Lodz University of Technology, Wólczańska 211/215 Street, Lodz 90-924, Poland.*

*5Ecoeffect Sp. z o.o. [Ltd.], Kardynała Stefana Wyszyńskiego 6B/6, 39-300 Mielec, Poland*

Metal Oxide semiconductors are one group of the new low cost materials with great potential for PV application. They have high photosensitivity and nontoxic nature in remediation of environmental pollution and solar energy conversion. The solar cells based on copper oxides (CuO, Cu2O) as active layers and TiO2 as buffer layer are extensively studied in the world. Cu2O/TiO2, CuO/TiO2 p–n junctions have emerged as promising materials for optoelectronics. These materials are also potentially useful for cheap and competitive solar cells construction. The subject of the work was to measure capacitance characteristics of Cu2O/TiO2 solar cells. Many parameters, namely Mott-Schottky characteristics, density of doping according to flat-band potential and base region doping level were calculated. In order to validate the results, the Cu2O/TiO2 heterojunction solar cells have been analyzed by the help of Solar Cell Capacitance Simulator (SCAPS).