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**Study of Ti-TiO<sub>2</sub> thin films by RBS, XRR and optical reflectivity**

Z. TARNAWSKI<sup>1,\*</sup>, K. DROGOWSKA<sup>1,4</sup>, K. ZAKRZEWSKA<sup>2</sup>, A. BRUDNIK<sup>2</sup>,  
E. KUSIOR<sup>2</sup>, M. SOKOŁOWSKI<sup>2</sup>, NHU-T.H. KIM-NGAN<sup>3</sup>, A.G. BALOGH<sup>4</sup>

<sup>1</sup>Faculty of Physics and Applied Computer Science, AGH University of Science and Technology, 30-059 Kraków, Poland

<sup>2</sup>Faculty of Electrical Engineering, Automatics, Computer Science and Electronics, AGH University of Science and Technology, 30-059 Kraków, Poland

<sup>3</sup>Institute of Physics, Pedagogical University, 30-084 Kraków, Poland

<sup>4</sup>Institute of Materials Science, Technische Universität Darmstadt, Petersenstrasse 23, 64287 Darmstadt, Germany

\*Corresponding author; Email: tarnawsk@agh.edu.pl

Single-, bi- and tri-layered films of Ti-TiO<sub>2</sub> system were deposited onto Si(111) substrates by magnetron sputtering from metallic Ti target in inert Ar or reactive Ar+O<sub>2</sub> atmosphere. The nominal thickness of each layer was 50 nm. The chemical composition and depth profile of the films were determined by Rutherford Backscattering Spectroscopy (RBS). Crystallographic structure was analysed by means of X-ray diffraction (XRD) at glancing incidence. X-ray Reflectometry (XRR) was used as a complementary method for film-thickness and density evaluation. Modelling of the optical reflectivity spectra recorded within the wavelength range of 220-2200 nm provided us with an independent estimate of the layer thickness. The combined analysis indicated that the real thickness of each layer was smaller than 50 nm while Ti and TiO<sub>2</sub> film-densities were slightly lower than the corresponding bulk values. SEM cross-sectional images confirmed this conclusion indicating the columnar growth of TiO<sub>2</sub> layers.