Fabrication of nanostructured titanium dioxide films and theirs properties

Cheewita Suwanchawalit\textsuperscript{1}\textsuperscript{*}, Thanatchaporn Tabtimsri\textsuperscript{1}, Montri Aiempanakit\textsuperscript{2}

\textsuperscript{1}Department of Chemistry, Faculty of Science, Silpakorn University, Sanam Chandra Palace Campus, Nakornpathom 73000, Thailand
\textsuperscript{2}Department of Physic, Faculty of Science, Silpakorn University, Sanam Chandra Palace Campus, Nakornpathom 73000, Thailand
*E-mail: suwanchawalit_c@su.ac.th

Abstract: Nanostructured titanium dioxide films (TiO\textsubscript{2}) were fabricated by electrochemical anodization method. Titanium dioxide film was deposited on glass slide using arrays High Power Impulse Magnetron Sputtering (HiPIMS) process. Nanostructured TiO\textsubscript{2} films were grown by anodization process in an electrolyte containing water and ethylene glycol with difference concentrations of NH\textsubscript{4}F. The effects of initial titanium metal layer and anodization voltage were also investigated. The samples were characterized by X-ray diffractometry (XRD), field emission scanning electron microscope (FESEM), and fourier-transformed infrared spectroscopy (FTIR). XRD results revealed that prepared TiO\textsubscript{2} films were anatase structure. The FESEM images showed that the inner pore diameter of nanotube TiO\textsubscript{2} films on glass slide have in the range of 75 to 81 nm. These nanostructured TiO\textsubscript{2} films are expected to be applied in pollutants elimination and other novel applications.

Keywords: Titanium dioxide; Nanostructured TiO\textsubscript{2} films; Anodization method