TiO_2 thin film structures coating by Plasma Chemical Vapor Deposition System

Nguyen Hoang Hai, 김교선*
강원대학교
(kkyoseon@kangwon.ac.kr*)

TiO2 films can be prepared by various methods, such as chemical vapour deposition, sputtering, ionized cluster beam, aerosol chemical vapour deposition and plasma chemical vapour deposition. In our work, TiO2 thin films were deposited on silicon wafer by Plasma Chemical Vapor Deposition (PCVD) system, which consists of the RF generator, precursor supplying system, vacuum system and plasma reaction chamber. We used titanium tetra-isopropoxide (TTIP) as the precursor of TiO2 films, and N2 pure gas or N2 mixed with O2 gas as plasma gas. The important process variables in this PCVD system are gas flow rate, precursor temperature, power and substrate temperature and we investigated the effects of these process variables on the morphologies of resulting TiO2 thin films. The TiO2 thin films were prepared for 20 min. The influences of initial TTIP concentration, oxygen flow rate were examined in detail. In this study, we demonstrate that a simple, one-step PCVD system can be applied to prepare TiO2 thin films with different controlled morphologies. The morphologies of TiO2 were characterized by scanning electron microscopy to study the morphology, by X-ray diffraction to study the structure and SEM cross section to deduce the film thickness.