TiO_2 Film Deposition on Silica Gel Powders using Plasma Enhanced Chemical Vapor Deposition and Sol-Gel Method

김국희, 박성희[1,*], 김상돈
한국과학기술원; [1]우석대학교
(drpark@woosuk.ac.kr*)

A circulating fluidized bed (CFB) reactor is a very useful tool for uniform deposition of well-adherent materials on supporting materials. TiO_2 film deposition on silica gel powders (100 μm) by the Plasma Enhanced Chemical Vapor Deposition (PECVD) method at atmospheric pressure has been studied in a CFB reactor (18 mm-ID × 1000 mm-high) without any post treatment. TiO_2 films from precursor $Ti(O-i-C_3H_7)_4$ (TTIP, 98%) were deposited on silica gel powders by using oxygen as a reaction gas. The effects of plasma power, oxygen concentration and argon concentration on deposition of TiO_2 thin films have been determined in a CFB reactor. TiO_2-deposited powders by PECVD were compared with those by the sol-gel method. The deposited thin films were characterized by the X-ray diffraction spectra, Raman spectroscopy, SEM and BET analyses. The BET data of TiO_2-deposited silica gel by the PECVD exhibits larger specific surface area (482.13 m^2/g) than that of the sol-gel method (429.67 m^2/g). Also, TiO_2 thin films are deposited uniformly by the PECVD on the external surface of the silica gel.