[物質生命化学]

33－21 A New Electrochemical Method To Prepare Mesoporous Titanium(IV) Oxide Photocatalyst Fixed on Alumite Substrate

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A TiO_2 film was deposited onto alumite using an electrochemical technique, where the initial electrodeposition was carried out by ac electrolvsis in $(NH_4)_2$ [$TiO(C_2O_4)2$] solution, followed by pulse electrolysis in $TiCl_3$. This is a new method to prepare a mesoporous TiO_2 photocatalyst film consisting of nanosized particles and to directly fix them onto the alumite substrate (Al/Al_2O_3). The sizes of the TiO_2 particles in the prepared film were about 5 nm, and they consisted of mixtured of the anatase, rutile, and amorphous phases. This film had a high catalytic activity for the decomposition of acetaldehyde even under fluorescent lamp illumination. Moreover, the preparation cost is very low compared with other methods. Therefore, the prepared $Al/Al_2O_3/TiO_2$ plate is very useful for the practical photodecomposition of chemical contaminants in the atmosphere. The mechanisms of the TiO_2 deposition and the photocatalysis are discussed.

(The Journal of Physical Chemistry B, Vol. 104, No. 17, p. 4204-4209 (2000).)