

SYNTHESIS, CHARACTERIZATION AND PHOTOCATALYTIC ACTIVITY OF TiO₂ NANOTUBE PRODUCED AT VARIOUS VOLTAGE

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ABSTRACT

The formation of self-organized TiO₂ nanotubes was investigated by anodizing titanium foils in electrochemical bath containing 1 M glycerol with 0.7 g NH₄F. The bath consisted of 2 electrodes; titanium foil as a working electrode and platinum plate as a counter electrode. The pH of the bath was kept constant at pH 6 and potential applied on the electrode was varied from 5 V to 30 V in an interval 5V. This is done to investigate the effect of voltage on the nanotubes formation. It was found that the self-organized TiO₂ nanotubes with different diameter size (20-80 nm) can be successfully established by simple altering the anodization voltage. For as-anodized sample, the self-organized TiO₂ nanotubes have amorphous structure and annealing at 400°C of the nanotubes promotes formation of anatase and rutile phase. Photocatalytic activity of the self-organized TiO₂ nanotube with various sizes was evaluated by measuring the degradation of methylene orange. The elaboration of this observation is described in detail in this paper.

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