

Preparation of porous carbon- Ti O₂ composite photocatalyst
from an ion exchanged resin

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Summary

We have studied the development of functional materials prepared by carbothermal reduction of ion-exchanged resin. In this work, we try to prepare the porous carbon- Ti O₂ composite photocatalyst with high activity and high adsorption capacity towards organic compounds

The high active photocatalyst was prepared from an amino phosphorous acid type chelate resin (C467) After the usual conditioning, the C467 was stirred in ice cold water with adding of aqueous solution of TiCl₃ or TiCl₄ (two times higher than its ion exchange capacity) for a period of 25 h. It was filtered and dried at room temperature and heat-treated / calcined in the air (300mL/min) for low temperature air oxidation and carbonized using N₂ stream at 500-800°C for 3h. The crystalline titanium compound in the carbonaceous material was identified by XRD. The quantitative estimation of titanium compound was estimated by the amount of the ash after burning in the air. Isopropyl alcohol (IPA) was used as a model organic compound to evaluate the photocatalytic activity and adsorption capacity of prepared TiO₂ photocatalyst. The high pressure mercury lamp with 365nm was used for irradiation. The catalyst was dispersed in the IPA solution and stirred by aeration. The concentration of IPA before and after the reaction solution was determined by FID-GC.

It was found that the IPA was completely removed from liquid phase by both photocatalytic decomposition and also adsorption onto the porous carbon. The addition of Pt to the porous carbon - TiO₂ photocatalyst improved the photocatalytic activity with keeping high adsorption capacity.