

Nanokompoziti TiO₂/PPy za primenu u fotokatalizi

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Titan(IV)-oksid je jedan od najčešće korišćenih fotokatalizatora, dok za polipirrol (PPy) postoje potvrde da je pogodan za ovu primenu. Cilj ovog rada bio je dobijanje kompozita TiO₂/PPy sa boljom fotokatalitičkom aktivnosti u odnosu na TiO₂. Kako bi se optimizovao sadržaj PPy u kompozitu, sintetisani su uzorci TiO₂/x%PPy ($x = 0, 0,5, 1, 1,5, 3, 5$ mas.%), koji su okarakterisani TG/DTA, XRD, FTIR, FESEM i UV-Vis metodama, dok su njihova fotokatalitička svojstva ispitana kroz razgradnju tekstilne boje RO16. Nanokristalni TiO₂ je dobijen u obliku anatasa veličine kristalita oko 26 nm, dok su izračunati parametri jedinične ćelije potvrdili da je kristalna struktura anatasa ostala nepromenjena nakon dodatka PPy. Gotovo svi uzorci (izuzev TiO₂/3%PPy) su fotokatalitički aktivniji od TiO₂, dok je TiO₂/1%PPy pokazao najizraženiju fotokatalitičku aktivnost razgrađivši 98 % boje nakon 75 min.

TiO₂/PPy nanocomposites for photocatalytic application

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Titanium(IV) oxide is one of the most used photocatalysts while polypyrrole (PPy) is a promising material for photocatalytic application. The aim of this work was to obtain TiO₂/PPy composites exhibiting higher photocatalytic activity than TiO₂. In order to determine the optimal PPy content in a composite, TiO₂/x%PPy ($x = 0, 0,5, 1, 1,5, 3, 5$ wt.%) samples were synthesized and characterized by TG/DTA, XRD, FTIR, FESEM and UV-Vis methods, while the photocatalytic behavior was examined towards the degradation of the textile dye RO16. Nanocrystalline TiO₂ was obtained in anatase form with crystallite size around 26 nm and preserved anatase crystal structure despite the addition of PPy according to the calculated unit cell parameters. Almost all samples (except TiO₂/3%PPy) showed better photocatalytic activity than TiO₂, while the best photocatalytic activity was demonstrated by TiO₂/1%PPy which degraded 98 % of the dye after 75 min.