عنوان مقاله:

Sol-Gel to Prepare Nickel Doped TiO۲ Nanoparticles for Photocatalytic Treatment of E ۱۳۱ VF Food Dye Wastewater

محل انتشار:

مجله بین المللی فناوری نانو در آب و محیط زیست, دوره 6, شماره 2 (سال: 1400)

تعداد صفحات اصل مقاله: 17

نویسندگان:

Malak Barakat - *Inorganic and Organometallic Coordination Chemistry Laboratory (LCIO), Faculty of Sciences (I), Lebanese University, Rafic Hariri Campus, El Hadath, Lebanon*

Rassil Khoder - *Inorganic and Organometallic Coordination Chemistry Laboratory (LCIO), Faculty of Sciences (I), Lebanese University, Rafic Hariri Campus, El Hadath, Lebanon*

Fatima Kassir - *Inorganic and Organometallic Coordination Chemistry Laboratory (LCIO), Faculty of Sciences (I), Lebanese University, Rafic Hariri Campus, El Hadath, Lebanon*

Zeinab Harajli - *Inorganic and Organometallic Coordination Chemistry Laboratory (LCIO), Faculty of Sciences (I), Lebanese University, Rafic Hariri Campus, El Hadath, Lebanon*

Mouhiaddine Mohamed El Jamal - *Inorganic and Organometallic Coordination Chemistry Laboratory (LCIO), Faculty of Sciences (I), Lebanese University, Rafic Hariri Campus, El Hadath, Lebanon*

Azadeh Ebrahimian Pirbazari - *Fouman Faculty of Engineering, College of Engineering, University of Tehran*

خلاصه مقاله:

Sol–gel method was applied for synthesis of TiO۲ nanoparticles in the existence of different volumes of ethanol (۱۰–۵۰ mL) with the purpose to find optimized synthesis conditions. Also, nickel doped TiO۲ nanoparticles (Ni/TiO۲ molar ratio: ۰.۱-۱.۰%) were prepared by the similar technique but in the existence of ۱۰ mL ethanol and heated at different temperatures (۳۰۰ °C –۶۰۰ °C). XRD, SEM/EDX, UV-Vis DRS, FTIR and Raman spectroscopy were applied to identify the structural and morphological characteristics of the as-synthesized samples. XR diffraction results verified that TiO۲ samples prepared with various volumes of ethanol (۱۰–۵۰ mL) consist of anatase and brookite phases up to ۵۰۰ °C and rutile phase at ۶۰۰ °C. The intensity of brookite diffraction decreased with the increase of calcination temperatures. Also, the low ethanol volume favored for formation of rutile phase at ۶۰۰ °C. The addition of Ni(II) during the preparation of TiO۲ nanoparticles prevented the formation of rutile phase. The undoped samples were synthesized with ۱۰ and ۲۰ mL ethanol and treated at ۵۰۰ °C displayed the best catalytic performance for photocatalytic treatment of E ۱۳۱ VF dye solution (rate constant: ۰.۰۵۱ and ۰.۰۶۱ (a.u) respectively). Ni doped TiO۲ samples displayed lower photoactivity and rate constant.

کلمات کلیدی:

Sol-gel, Ni/TiO۲, Ethanol, Food dye E ۱۳۱ VF, Kinetic study

لینک ثابت مقاله در پایگاه سیویلیکا: