

International Conference and Exhibition on

Materials Chemistry

March 31-April 01, 2016 Valencia, Spain

Poly-pickering-HIPEs as heterogeneous photocatalysts

Fatma Nur Parın¹, Elif Yüce¹, E Hilal Mert¹, Peter Krajnc², Nevim San³ and Dila Kaya³¹Yalova University, Turkey²University of Maribor, Slovenia³Yildiz Technical University, Turkey

In recent years, the field of heterogeneous photocatalysis has been growing rapidly, as a result of the various developments especially in relation to energy and the environment. In this context, the large band-gap semiconductors are attracting considerable interest in many practical applications such as catalysts, solar cells, dyes, and commercial products ranging from drugs to foods. For industrial applications, high activity, resistance to poisoning and stability for prolonged use at elevated temperatures, mechanical and chemical stability in various conditions are needed. In this respect, TiO₂ has been the most preferred material in many fields due to its long-term photo-stability, relative low toxicity, semiconducting and catalytic properties. In this study, we prepared a new kind of macroporous composite having photocatalytic activity, via emulsion templating. With this aim, Pickering-high internal phase emulsions (Pickering-HIPEs) stabilised with surface modified TiO₂ nanoparticles (TiNPs) were used as templates. TiNPs were synthesised via sol-gel method by using poly(ethylene glycol-co-propylene glycol-co-ethylene glycol) triblock copolymer. By the polymerisation of the Pickering-emulsion templates poly-Pickering-HIPE/TiO₂ composites, having relatively good mechanical properties and thermal stability, were obtained. The photocatalytic activity of poly-Pickering-HIPE/TiO₂ composites were determined by investigating the kinetics of the photocatalytic degradation of 4-nitrophenol (4-NP), an environmentally important pollutant, in a constant temperature batch-type photoreactor. The effects of initial pollutant concentration, catalyst concentration and pH value of suspension on the degradation rates of 4-NP have been studied. A kinetic expression, which can be used in the development of large-scale photocatalytic reactor and optimization of experimental conditions, has been obtained.

Biography

Fatma Nur Parın has completed her Bachelor's degree as high honor student from Yalova University, Polymer Engineering Department. She is a MSc student at the same Department and is working as a project researcher.

nurparin@hotmail.com

Notes: