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Synthesis of Mn₃O₄/PolyDCPD Nanocomposite Materials by HIPE and ROMP Approaches

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In recent years, polyHIPEs with high porosity derived from high internal emulsions are being widely studied. PolyHIPEs are important in some areas such as cell culture, pure protein constructions, enzyme immobilization, water and carbon dioxide treatment, hydrogen storage and sensor materials. Due to unstable and brittle structure, their uses in industrial areas have not become more widespread. To improve the poor mechanical properties of polyHIPE foams, polyDCPD was prepared via ring opening metathesis polymerization (ROMP). In this study, dicyclopentadiene (DCPD)-based nanocomposite materials containing Mn₃O₄ nanoparticle (NP) have been synthesized for the first time. Nanocomposites were synthesized by the polymerization of a continuous phase of high internal phase emulsions containing Mn₃O₄ NPs. In these syntheses, deionized water was used as an internal phase, Pluronic-L121 was used as surfactant, and ruthenium alkylidene catalyst was used as the initiator. The effect of nanoparticle amounts on the structure of nanocomposites was examined in detail (Fig. 1). The prepared nanocomposites were characterized by SEM, BET surface area, FTIR, DSC and TGA analysis. Authors would like to thank Kirikkale University Scientific Research Projects Coordination Unit (Turkey) (Project No. 2017/073) for financial support of this work.

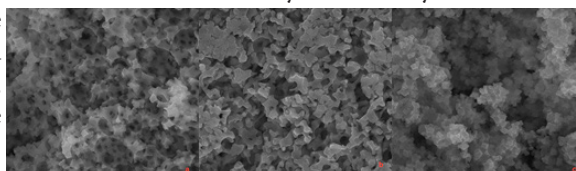


Fig. 1. SEM images of nanocomposites containing Mn₃O₄ NPs, a) 1%; b) 5%; c) 10%.

Biography

Rabia Yeşil is currently a MSc student in the Department of Chemistry at Kirikkale University (Turkey). She graduated from Kirikkale University Chemistry Department in 2015. She is working on a research project as a scholar. Her research interests include nanocomposite synthesis and applications.

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