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Ispitivanje uticaja provodljivosti početnog rastvora i koncentracije katalizatora na sintezu silika nanočestica sol-gel metodom

Ispitan je uticaj katalizatora, njegove koncentracije, kao i promene provodljivosti početnog rastvora na karakteristike silika nanočestica sintetisanih modifikovanom sol-gel metodom. Nanočestice su okarakterisane praćenjem promene raspodele pomoću Zetasizer Nano ZS, Malvern Instruments Ltd, posmatranjem raspodele optičkom mikroskopijom i snimanjem IC spektara sintetisanih uzoraka. Rezultati su pokazali da je NaOH bolji katalizator u poređenju sa NH_3 kao i da povećanje koncentracije katalizatora i provodljivosti početnog rastvora imaju povoljan uticaj i snižavaju srednji prečnik nanočestica. Čestice najpovoljnijih karakteristika, najmanjeg najzastupljenijeg prosečnog prečnika 50.7 nm sintetisane su u 1 M rastvoru NaOH uz 0.97 M NaBr. Ovakve čestice u 0.2% suspenziji u hloroformu pokazale su indeks polidisperznosti od 0.236. Snimljeni su SEM uzoraka sintetisanih pri različitim koncentracijama NaOH koji su pokazali da su dobijene nanočestice sfernog oblika.

Influence of Conductivity of the Initial Solution and Catalyzer Concentration on the Synthesis of Silica Nanoparticles by Sol-gel

The influence of concentration and type of the catalyzer, as well as the changes in conductivity of the initial solution on the characteristics of nanoparticles synthesized by modified sol-gel method have been tested. Nanoparticles have been characterized by following the changes in distribution by Zetasizer Nano ZS, Malvern Instruments Ltd, observing the distribution under an optical microscope, and recording the IR spectrum of the synthesized samples. The results showed that NaOH is a better catalyzer than NH_3 and that the higher concentration of the catalyzer and the higher conductivity both have a favorable influence on the synthesis of nanoparticles of a smaller diameter. Nanoparticles of the smallest diameter of 50.7 nm have been synthesized in a 1 M solution of NaOH with 0.97M NaBr. These particles have the index of polidispersity of 0.236 in 0.2% (mass fraction) suspension in chloroform. The SEM images of the sample synthesized in different concentrations of NaOH showed that the particles are spherical in shape.

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