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Synthesis of Nano Iron Copper Core-Shell by Using K-M Reactor

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Abstract : In this study, Nano iron-copper core-shell was synthesized by using Kinetic energy micro reactor (K-M reactor). The reaction between nano-pure iron with copper sulphate pentahydrate (CuSO4.5H2O) beside NaCMC as a stabilizer at K-M reactor gives many advantages in comparison with the traditional chemical method for production of nano iron-Copper core-shell in batch reactor. Many factors were investigated for its effect on the process performance such as initial concentrations of nano iron and copper sulphate pentahydrate solution. Different techniques were used for investigation and characterization of the produced nano iron particles such as SEM, XRD, UV-Vis, XPS, TEM and PSD. The produced Nano iron-copper core-shell particle using micro mixer showed better characteristics than those produced using batch reactor in different aspects such as homogeneity of the produced particles, particle size distribution and size, as core diameter 10nm particle size were obtained. The results showed that 10 nm core diameter were obtained using Micro mixer as compared to 80 nm core diameter in one-fourth the time required by using traditional batch reactor and high thickness of copper shell and good stability.

Keywords : nano iron, core-shell, reduction reaction, K-M reactor
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