

Microfluidic Continuous Approaches to Produce Magnetic Nanoparticles with Homogeneous Size Distribution

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Abstract : We present a gas-liquid microfluidic system as a reactor to obtain magnetite nanoparticles with an excellent degree of control regarding their crystalline phase, shape and size. Several types of microflow approaches were selected to prevent nanomaterial aggregation and to promote homogenous size distribution. The selected reactor consists of a mixer stage aided by ultrasound waves and a reaction stage using a N₂-liquid segmented flow to prevent magnetite oxidation to non-magnetic phases. A milli-fluidic reactor was developed to increase the production rate where a magnetite throughput close to 450 mg/h in a continuous fashion was obtained.

Keywords : continuous production, magnetic nanoparticles, microfluidics, nanomaterials

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