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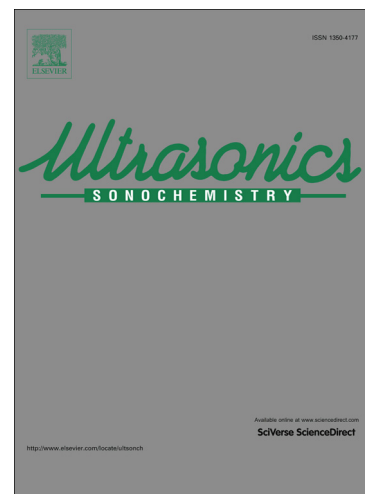
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One minute synthesis of amino-silane functionalized superparamagnetic iron oxide nanoparticles by sonochemical method

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Abstract

Superparamagnetic iron oxide nanoparticles (SPION) are material of interest for biomedical research and related applications. Recently, several works have reported facile sonochemical method of functionalizing nanoparticles with organic coupling agents. Herein, we present the influence of ultrasonic irradiation on the rate of functionalization of 3-amino propyl triethoxyl silane (APTES) on SPION. The effect of sonication on the process is investigated by varying the sonication period between 1 and 20 minutes. Grafting of the organo-metallic molecules on SPION is demonstrated through FTIR and XPS. The results show that in one minute, organo-silane compound can be functionalized onto SPION through unique conditions generated from ultrasonic irradiation. The XPS survey spectra of the as-synthesized APTES-SPION at different sonication periods revealed that absorbed energy due to silanization reactions in all the samples appeared at same peaks. The percentage atomic concentrations of all the elements present in the as-synthesized APTES-SPION are determined by the software CASAXPS. The result demonstrated that highest percentage atomic concentration is observed at the one minute sonication period.

Keywords- APTES, Amino-silane; Functionalization; Nanoparticles; Silanization; Sonochemical; SPION

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