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Frequency Mixing Magnetic Detection of Magnetic Nanoparticles

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Message from the Guest Editors

Frequency mixing magnetic detection (FMMD) has been well-established for more than 15 years as a sensitive and very selective technique to quantitatively probe magnetic nanoparticles by their nonlinear responses to a two-frequency magnetic excitation field. The method has been applied for numerous magnetic immunoassays of different biological targets, with better sensitivities and detection ranges than the standard enzyme-linked immuno sorbent assay (ELISA) techniques. In this Special Issue, the fundamentals of FMMD methodology will be comprehensively explained, the design and realization of FMMD instrumentation will be presented; and various FMMD applications from the fields of biomedicine, nanomaterials characterization and even the non-destructive evaluation of fatigue will be highlighted. In particular it will present how offset field scanning is employed to determine the core size distribution of magnetic particles; a phase evaluation allows for the assessment of the Brownian relaxation, yielding information on the binding state of magnetic particles to biological targets; FMMD has been applied as a detection modality for magnetic particle imaging (MPI).

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Message from the Editor-in-Chief

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