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# Magnetic hybrid magnetite/metal organic framework nanoparticles: facile preparation, post-synthetic biofunctionalization and tracking in vivo with magnetic methods

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**Keywords:** hybrid nanoparticles; multifunctional and multimodal nanoparticles; metal organic frameworks; MRI contrasting; biomagnetic measurement; lateral flow assay.

## Abstract

*Multifunctional hybrid nanocomposites remain to be of great interest in biomedicine as a universal tool in a number of applications. As a promising example, the nanoparticles with magnetic core and porous shell have a potential as theranostic agents combining both the diagnostics probe and drug delivery vehicle properties. However, reported methods of the nanostructure preparation are complex and include tedious time-consuming growth of porous shell by means of layer by layer assembly technique. In this study, we develop new way of fabrication of the superparamagnetic magnetite core @ porous metal organic framework shell nanoparticles and demonstrate their application both as a multimodal (MRI contrasting, magnetometric and lateral flow optical labeling) and multifunctional (in vivo bioimaging, lateral flow assay) agents. The easiness of fabrication, controllable bioconjugation properties and low level of non-specific binding indicate high potential of the nanoparticles to be employed as multifunctional agents in theranostics, advanced biosensing and bioimaging.*

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