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Self-assembly of Iron Platinum Based Nanoparticles on Liquid and Solid Substrates

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Self-assembly of magnetic nanoparticles into a long-range monolayer pattern is under investigation in both theoretical aspect and data storage application. In this work, the effect of solid and liquid substrates on the nanoparticle assembly was compared. Iron (III) dibenzoylmethane (Fe(dbm)3) was used as an alternative reagent to highly toxic iron pentacabonyl (Fe(CO)5) in the co-reduction with platinum acetylacetonate (Pt(acac)2). The as-synthesized iron-platinum (FePt) based nanoparticles were dropped either on diethelyne glycol (DEG) or directly on Transmission Electron Microscopy (TEM) grid. In the case of DEG, the drastic movement of nanoparticles during the liquid-air interface assembly tracked by a camera terminated after 15 seconds. A subsequent inspection after transferring the monolayers from DEG to TEM grid substrates confirmed the extended area of ordered nanoparticles from the liquid-air interface assembly.

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