

GdFeCo nanoparticles for all-optical magnetization switching

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All optical switching (AOS) of the magnetization, discovered over a decade ago in GdFeCo ferrimagnetic alloy, is a hot topic in ultrafast condensed matter science due to high potential for implementation in data storage technology, substituting the writing head by ultrashort laser pulses in magnetic hard drives. However, most of study was on thin films, where the switched area is compatible with laser beam size. The alternative is to use magnetic nanoparticles (NP) as a working media for AOS. Magnetic NP with size in order of several tenth of nm are good candidates to move the optically switched state to nanoscale levels. While synthesis of homogeneous NP is well established, creation of GdFeCo magnetic NP remains unexplored. Here, we present our findings on synthesis and testing of GdFeCo magnetic nanoparticles, in scope of using them for AOS, with PEEM and high field soft X-ray spectroscopy techniques. We demonstrate that most of NP are in an oxidized state when deposited, however we could avoid it if NP deposited on Si₃N₄ substrate.

Position

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