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**Plasmon-mediated large enhancement of magneto-optical activity in colloidal magnetic metals** GERVASI HERRANZ, ONDREJ VLASIN, OANA PASCU, ANNA ROIG, Institute of Materials Science of Barcelona, ICMAB-CSIC — Magnetic properties may undergo dramatic changes at the nanoscale that, eventually, can be exploited as a basis for enhanced functionality. This is the case that we present here, in which we analyzed the rotation and ellipticity that magnetic nanoparticles exerted on the polarization of light. More specifically, we observed an outstanding increase of the magneto-optical activity at the frequencies of the plasmon resonances of the metallic magnetic nanoparticles, yielding a dramatic increase of the Verdet constant. Furthermore, we have established an innovative theoretical framework in excellent quantitative agreement with the experimental data, endowing our model with a powerful predictive character for the interaction of polarized light with magnetic nanoclusters embedded in dielectric hosts. The relevance of our results goes well beyond the particular case of colloidal metals, as other systems such as metal inclusions in polymers or glasses containing small magnetic clusters can be as well considered. In addition, the observed large Verdet constants allow envisioning the exploitation of light polarization, instead as the commonly used reflectance, as a probe for plasmon-sensing devices. Our results provide new routes for plasmon-based biological and chemical detection.

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