Optical and magneto-optical properties of composite noble-metal-ferromagnetic thin films

MICHELLE SESTAK, JONATHAN SKUZA, R. ALEJANDRA LUKASZEW, The University of Toledo, Toledo, Ohio — We will report on the optical and magneto-optical properties of thin films composed of a magneto-optically active part and a noble metal that acts as a plasmonic counterpart: magneto-plasmonic materials. We will show that such combination leads to structures with novel properties that can be used to achieve more efficient and sensitive nanophotonic devices based on surface plasmon resonance. We will compare a material consisting of a noble/ferromagnetic/noble metal (i.e. Au/Co/Au) trilayer, in which the optical and magneto-optical response can be tailored by varying the thickness of the different layers, with a nanocomposite material made with magnetic nanoclusters embedded on a noble metal matrix. The clusters are ion-implanted onto the noble metal matrix and their size and penetration depth can be tailored by choosing the ion-implantation conditions. We will show how sub-nanometer modifications can enhance the magneto-optical response of the system.

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Date submitted: 02 Dec 2006

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