MAGNETO-OPTICAL KERR EFFECT SPECTROSCOPY OF MAGNETIC OXIDES AND ORGANIC/OXIDE HETEROSTRUCTURES

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Recent progress in multiferroic materials and spintronic devices has renewed interest in metal oxide ferromagnetic and ferrimagnetic materials. We recently showed, on the example of $CoFe_2O_4$ (CFO) that the preparation of high-quality thin films of nanocrystalline ferrimagnetic can be achieven by means of an environmentally benign aqueous solution processing route [1]. In addition to the ability to make high quality ferrite films, the aqueous solution processing strategy offers great flexibility for tuning film properties by incorporating or substituting additional transition metal ions. Furthermore, it can also be applied for the preparation of $La_{1-x}Sr_xMnO_3$ films [2], which is in discussion as material with high potential for spintronic applications as such or in combination with organic molecules.

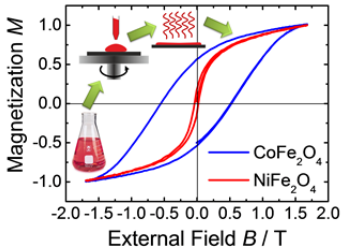

Fig. 1. Magnetization loops obtained by MOKE magnetometry for high-quality ferrite films fabricated by aqueous solution processing

The evolution of the structural, optical, and magnetic properties as a function of post-deposition annealing temperature was performed by HR-TEM and (magneto-)optical techniques: spectroscopic ellipsometry and magneto-optical Kerr effect spectroscopy. The latter methods were also employed to study the effect of the substrate magnetization on the molecular orientation of phthalocyanine molecules impozed during the growth on the ferrite substrates.

Keywords: magnetic oxides, organic molecules, MOKE spectroscopy, spectroscopic ellipsometry

References

[1] Peter Richter, Paul N. Plassmeyer, Julia Harzdorf, Tobias Rüffer, Jana Kalbacova, Nathanael Jöhrmann, Steffen Schulze, Michael Hietschold, Heinrich Lang, Sri Sai Phani Kanth Arekapudi, Manfred Albrecht, Dietrich R.T. Zahn, Catherine J. Page, and Georgeta Salvan, Chem. Mater. 2016, 28, 4917−4927.
[2] Manuel Monecke, PhD Thesis, Chemnitz