Systematic study of magnetic properties on 2D submicron elements with respect to different deposition method

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2D submicron patterned arrays were prepared using PS mask and deposited mainly by electron-beam evaporation as well as by sputtering method. These different techniques affect the properties of magnetic elements. For example using electron beam evaporation we create triangular shaped particles, while sputtering method results in spherical elements (Fig. 1b). The shape obtained after sputtering is due to the shadowing effects arising from the high evaporation rate. In case of electron beam evaporation material precisely fill the space between the latex spheres. Therefore the sides of triangular elements have round curvature, as it is shown in figure 1a.

These various geometries lead to interesting systems for the study of the micro-magnetic configuration. In particular, magnetic ordering depends sensitively on the element size, element thickness, as well as on the exact shape.

So far only a few investigations have been reported for equilateral triangular elements [1, 2]. However, because our systems consist of triangles with round boarders, these results are not completely appropriate. It has been found that the c-state configuration computed for ideal triangle can not exist in case of geometry observed by AMF (Fig. 1a) and confirmed by SEM imaging.

The numerical studies have been carry out for nickel evaporated through a PS mask varying between 496 nm and 1710 nm. In addition we will present results on the temperature dependence of the magnetization evaluated by SQUID magnetometry, on the hysteresis loops obtained by VSM, as well as from MFM and XMCD-PEEM imaging.

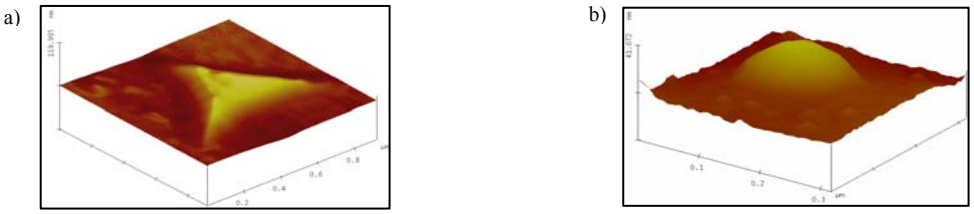

Fig.1. 3D AFM images a) nickel triangle deposited by electro-beam evaporation, b) spherical cobalt particles obtained by magnetron sputtering

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[2] R.P.Cowburn, Topical Review J. Phys. D, **33** (2000) R1

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