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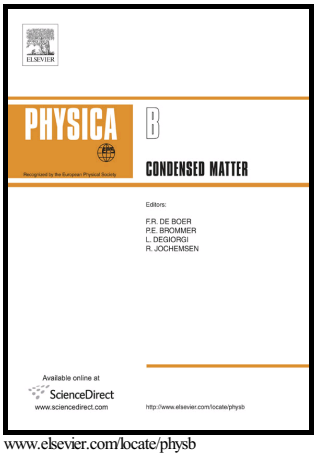

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Structural and magnetic properties of self-assembled cobalt on porous silicon; experimental and micromagnetic investigations

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Abstract

In this paper, we report on self-assembled Co nanoparticles deposited in and on Porous Silicon (PS) matrix by using UHV evaporation. Four samples were prepared by varying the Co deposited thickness (t=3, 5, 7 and 10 nm). All samples have been investigated by means of Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM) and Physical Properties Measurement System (PPMS). The increase of t has induced an increase of the nanoparticle diameter from 3 nm to about 150 nm. Referring to the magnetic characterizations, this increase has been followed by a single to multi-domain transition. Therefore, this has been evidenced by a switching from superparamagnetism to purely ferromagnetism accompanied by a change in the magnetic reversal dynamics. Thus, by