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Proximity effect in superconducting/magnetic nanostructures. JOSE L. VICENT, ELENA NAVARRO, NURIA O. NUNEZ, Universidad Complutense de Madrid, ALFONSO CEBOLLADA, Instituto de Microelectronica de Madrid, ALEJANDRO PEREZ-JUNQUERA, JOSE I. MARTIN, Universidad Oviedo — Fe nanoparticles have been grown by sputtering technique on sapphire substrates. The fabrication parameters (substrate temperature, rate, ...) allow us to change the nanoparticle sizes at will. Different elements have been deposit on top of these Fe nanoparticles. The magnetic behaviour of the Fe nanoislands strongly depends of the capping material, for instance capping with thin Al film does not change the magnetic behaviour of the nanoislands, but capping with thin Pt film induces an enhancement of the magnetic nanoparticles coupling, and finally exchange bias develops in the nanostructured system Cr layer on top of Fe nanoislands. Nb films have been deposited on top of these nanostructures. The superconducting/magnetic proximity effect has been studied for different capping materials (Al, Pt, and Cr) and different Fe nanoparticle sizes. We will show that the superconducting proximity effect strongly depends on the capping materials, with interplay between exchange bias and superconductivity leading to enhancement of the superconducting critical temperature.

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