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Magnetic Interaction Impact on Coercivity and Blocking Temperature in Co Nanoparticles DONGTAO ZHANG, YOU QIANG, NANOPHYSICS TEAM — Magnetic nanoparticle interaction such as exchange and dipole interaction displays a rich variety of magnetic configurations resulting from competing energy terms. In this paper, we successfully prepared Co nanoparticles on Si (110) substrate with monodispersive particle size using an improved nanocluster deposition system. The particle film deposited on surface of Si wafer with different thickness from less than one cluster layer (non-interacting) through two cluster layers (weakly interaction) to a dense system of eight cluster layers (strongly interacting) were obtained by carefully adjusting the deposition time. There is an obvious magnetic interaction in the dense system, but it can be neglected in less than one layer sample for the large interparticle distance. Increase of the blocking temperature (TB) and coercivity with increasing of the film thickness is observed for the enhancing magnetic dipole interaction, and the TB is increased from 220 K to above room temperature. Also, the annealing study on the coercivity and blocking temperature found that high temperature quick annealing have a complex effect on the magnetic behavior.

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