Shape, size and internal structure influence on magnetic properties and reversal magnetization in nanodots

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Magnetization reversal of nanodots is fundamentally correlated with their size, shape as well as internal structure. In this work we investigate experimentally magnetic properties of monodomain magnetic dots induced by a patterned buffer in a multilayered metallic film. Experimental results are supported by micromagnetic calculations. Considered nanodots (50 – 500 nm in size) are perpendicularly magnetized. The modelled dot internal structure is uniform or composed of a core and an edge characterized by different anisotropy constants – higher or lower than that of the core. Such approach explains the differences observed in behavior of real magnetic dot fabricated by various methods. The shapes of dots assumed in calculations (round, triangular and hexagonal) are experimentally observed. Based on calculated hysteresis loops we discuss in details the magnetization reversal processes, stability of magnetic structure, and spin configurations in the dots.

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