Dependence of Kerr effect in two-layered F/N structures upon d-shell filling in normal metal

V. Skidanov[1]

[1] *Institute for Design Problems in Microelectronics RAS, 124365 Moscow, Russia*

Experimental investigation of Kerr effect in two-layered F/N and N/F film structures reveals non-monotonic dependence of magnetooptical signal upon nanoscale (0-200 nm) thickness of normal (N) transition metal layer with unfilled d-shell. It is shown that the presence of normal transition metal layer with thickness up to 200 nm atop ferromagnetic metal significantly modifies magnetooptical reply of the film structure including enhancement and inversion of Kerr effect instead of exponential reduction with normal metal thickness. The signal value was measured at the equal reflected white light intensity to avoid uncertainty caused by interference effects and different light absorption due to variety of samples thickness values. Investigations were made with a wide number of normal transition metals with different fillings of atomic shells 3d, 4d and 5d (Ti, Cr, Mo, Ta, Re, Pt, W). It was shown that the influence of normal metal layer rigorously depends upon filling of atomic d-shell of the metal. Inversed signal amplitude gradually reduced with d-shell filling. No signal inversion was observed for Cu and Au with filled 3d and 5d atomic shells. But two-fold enhancement of magnetooptical signal from Py film was found with Cu or Au layers underneath.