

MAGNETORESISTANCE OF SINGLE NiFe AND MULTILAYERED NiFe/Cu NANOWIRES

H. Chiriac, S. Krimpalis, N. Lupu

National Institute of Research and Development for Technical Physics, Iasi, Romania

After the observation of the GMR effect and its use in high-density magnetic recording media and novel magnetic sensors, the interest for nanostructured magnetic materials increased significantly.

The nanowires, because of their dimensions and unique characteristics, exhibit unusual physical properties, which make them exciting from both fundamental and technological point of view. Magnetic nanowires, in particular, are very interesting from the point of view of the spin-dependent electric transport phenomena. There are many different ways to produce nanowires, but one of the cheapest ways is the electrochemical deposition, which avoids the difficulties inherent to the nanolithography processes and allows producing important amounts of nanowires in relatively short periods of time.

In this study we will focus on the magnetoresistance of single NiFe and multilayered NiFe/Cu nanowires in the current perpendicular to plane (CPP) geometry. The measurements done on a number of nanowires (tens to hundreds) are compared with those obtained for individual nanowires. For this last purpose, special equipment has been designed and fabricated. As parameters we used the diameter and length of the nanowires, the number of consecutive sequences and the thickness of each sequence for multilayered structures, but also the external magnetic field.