

Unusual temperature and pressure dependencies of FMR signal observed for Ni/C in the polymer matrix.

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FMR study of carbon coated nickel nanoparticles in the PBT-block-PTMO polymer show unusual temperature and pressure dependencies of signal parameters. A decrease of the resonance field with temperature is accompanied by increase of the line width. Hydrostatic pressure causes increase of resonance field and narrowing of the line width. These phenomena can be understood on the assumption that the nickel nanoparticles, with the average diameter of 10-20 nm have some degree of freedom in the polymer matrix. As a result, part of them can perform a small turn to the direction of the external magnetic field. This influences the effective resonance field of nanoparticles in composite and increases the effective anisotropy, which effects the line width. Hydrostatic pressure acts mainly on the matrix, which compression forces return of nanoparticles to the initial arrangement.