Ferromagnetic nanoparticles in polymeric matrix processed bypolymerization of metal containing monomers

E. Sowka[1], M. Leonowicz[1], B. Andrzejewski[2], A. D. Pomogailo[3], and G. I. Dzhardimalieva[3]

[1]*Faculty of Materials Science and Engineering, Warsaw University of Technology*
Wołoska 141, Warsaw, Poland
[2]*Institute of Molecular Physics Polish Academy of Sciences*
Smoluchowskiego 17, Poznań, Poland
[3] *Institute of Chemical Physics Russian Academy of Sciences, 142432 Chernogolovka, Russia*

Unique properties of nanomaterials, resulting from nanosized components, have recently been a subject of intensive studies. In this work polymeric matrix ferromagnetic nanocomposites, containing Co nanocrystallites, were processed by an innovative fabrication method using frontal polymerisation of cobalt acrylamid complex (CoAAm). The material, depending on the pyrolysis temperature, consists of Co nanocrystallites having the mean size 7.2 nm and 21.3 nm, for the material pyrolysed at 873 K and 1073 K, respectively (Fig. 1).

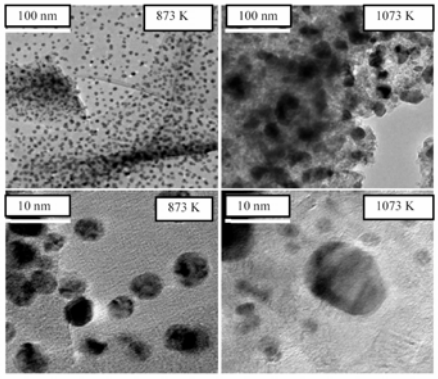

Fig. 1. HRTEM micrographs of the nanocomposite material after pyrolysis at 873 and 1073 K, respectively

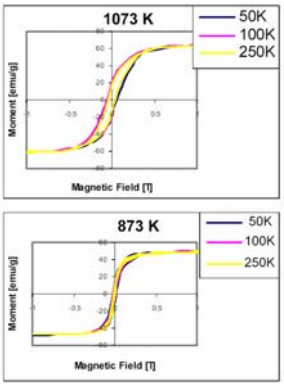

Fig. 2. Hysteresis loops of the nanocomposite material after pyrolysis at 873 and 1073 K, respectively, recorded at temperatures 50, 100 and 250 K

The hysteresis loops recorded for materials processed at 873 and 1073 K, respectively proved that the coercivity depends on the processing temperature and very slightly on the measurement temperature (Fig. 2). The loops taken at temperatures 50, 100 and 250 K almost overlap. According to the commonly approved classification the coercivity of the composite material processed at temperatures 873 and 1073 K can be regarded as magnetically soft and hard, respectively.

Name of the presenting author (poster): Marcin Leonowicz
e-mail address: mkl@inmat.pw.edu.pl
url's: http://www.inmat.pw.edu.pl