Nanocomposites and nanomaterials

Linear Magnetoresistance of Graphite Nanoplatelets

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The work presents the results of experimental investigations of magnetoresistance of graphite nanoplatelets (GNP) in wide interval of temperature (from 2 K up to 293 K) and magnetic field up to 9T. The GNPs have been obtained by sonication of source thermoexfoliated graphite (TEG) particles in acetone (3 hours) and water (30 hours) medium. The electron microscopy investigation have shown that obtained GNPs are disk-shaped particles with diameter about (0.2-20) μm and thickness about (4-20) nm. The Fig. 1 presents the typical field dependences of magnetoresistance (/(B)) for bulk specimens of GNPs at different temperatures. For comparison the /(B) for TEG are also presented.

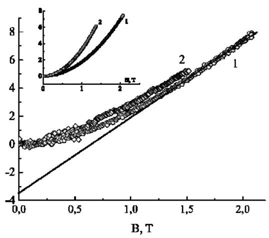

Figure. /(B) for graphite nanoplatelets and TEG (inset): 1 – $T = 293$K, 2 – $T = 77$ K.

As it is seen from Fig. for GNPs in contrast to TEG:

- magnetoresistance does not depend on temperature;
- at B > 1 T magnetoresistance is linear depend on magnetic field and and does not reach the saturation;
- the transition magnetic field does not depend on temperature.

It is shown, that observed linear magnetoresistance effect is satisfactorily described in the terms of Abrikosov model of quantum linear magnetoresistance.