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The Magnetoresistance of Single Wall Carbon Nanotubes Modified by Nickel

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The work presents the results of magnetoresistivity investigations of modified with nickel single wall carbon nanotubes (SWCNTs) at T=293 K at different mutual orientations of the magnetic field and current through the specimen.
SWCNTs have been obtained by arc method with use Ni particles as catalysts. The specimen of CNTs contains SWCNTs with a diameter of 1.5 nm and nickel particles up to 2 nm.
The angle between the direction of the magnetic field and the cur-rent through the specimen was 00 (parallel orientation), 300, 600 and 900 (perpendicular orientation). The error in measuring of resistance did not ex-ceed 0.1%.
For all mutual orientation of magnetic field and current through specimen the magnetoresistance is positive and increases with increasing magnetic field.
In the field dependences of the magnetoresistance at mutual orientation 00, 300 and 600 there is no hysteresis, that is very often observed in the magnetoresistance for CNTs modified with magnetic metal. The hyste-resis is observed only at perpendicular orientation of magnetic field and cur-rent and the magnetoresistance in the field up to 2.2 T does not reach satura-tion.
The asymmetry of the magnetoresistance for bulk specimen of modi-fied by nickel SWCNTs is associated with significant heterogeneity of the specimen structure and the presence of nanosized nickel particles. Na-nosized nickel particles cause inhomogeneity of the Hall transverse voltage along the specimen.

Topics

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