Magnetotransport properties of metallic/semiconducting single-walled nanotubes

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We have investigated the magnetotransport properties of sorted metallic and semiconducting SWNT films. After showing a weak localization effect, the metallic SWNT film shows a spin-dependent variable range hopping conduction effect. This is similar to the results observed in the mixed SWNT films, which indicates these magnetic field effects are due to the junctions of SWNTs. Indeed, by reducing the contact between the SWNTs inside the film and by using the non-contact method, we have succeed to observe a positive magnetoresistance which is ascribed to the AB effect of metallic SWNT.

The result of semiconducting SWNT film is also presented, and the origins of the magnetotransport effects are discussed.

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