

## Optical Study on Electronic Transport Properties of Single-Walled Carbon Nanotubes at High Temperature

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<b>Abstract</b>	<p>The transport properties of single-walled carbon nanotubes (SWNTs) above room temperature are studied in this work. The infrared optical properties of SWNTs were investigated to clarify their conduction mechanism at high temperature. We present reflectivity spectra of SWNT mats in the infrared region between 0.08 eV and 0.8 eV under Ar gas flow at temperatures between 330 K and 840 K. These spectra have the typical appearance of the metallic reflectivity. Examination within the framework of the Drude-Lorentz model was performed to work out the electric resistivity for each reflectivity spectrum. It was found that the resistivity of SWNTs increases superlinearly with increasing the temperature from 330 K to 690 K, which can be explained by the quasi-1D metallic term model very well. However, the resistivity at higher temperatures than 690 K exhibited the tendency of saturation and deviated from the quasi-1D metallic term model. This behavior could be attributed to the thermal excitation of free carriers in the semiconducting SWNTs included in the mats.</p>
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