

Proximity Induced Supercurrent through Nb-Carbon Nanotube-Nb Josephson Junction

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Carbon Nanotube (CNT) is a good candidate for electronic device of the new era because of its extraordinary electrical properties and well-defined low-dimensional structure. If a conducting CNT is attached in between two superconducting electrodes, it will be possible to form superconductor - normal metal (or semiconductor) - superconductor junction (SNS junction). In this study, the superconducting electrodes are prepared by e-gun evaporation of Nb on SiO₂/Si substrate and the CNTs are suspended by chemical solvent, using Sodium Dodecyl Sulfate (SDS), before the evaporation. Below the T_c of the electrodes, the Cooper pairs of the electrode are injected to the CNT, and then a proximity-induced superconductivity in CNT can appear. Clearly, this effect will be influenced by the contact condition. We studied this subject with different conditions, such as the spacing of electrodes, contact resistance, and the number of CNT as well as the characteristics of CNT employed.

keywords : CNT, proximity effect