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Study on carbon nanotube preparation using arc discharge in liquid helium HIROHARU KAWASAKI, TOSHINOBU SHIGEMATSU, YOSHIROU TERASAKI, TAMIKO OHSHIMA, YOSHIHITO YAGYU, YOSHIAKI SUDA, Sasebo National College of Technology — Arc in liquid method has been developed as a cost-effective technique to fabricate various kinds of carbon nanomaterials. In liquid nitrogen, especially high-quality multi-wall carbon nanotubes were observed. Our research aims at creating carbon nanomaterials using contact arc method in liquid nitrogen and in liquid helium. For this research, a special evaporation cryostat, which has moving parts at low temperature part, is prepared. Experiments in liquid nitrogen were carried out at current density 8, 10, 12 and 14 kA/cm^2. At current density 10 and 12kA/cm^2 ample fibrous carbon nanomaterilas could be obtained. Then, based on the results of discharged experiments in liquid nitrogen, productive experiments were done in liquid helium. At that time, in discharged experiments, ample carbon clusters could be observed at current density 10kA/ cm^2. Using TEM Imaging, it turn out that these clusters were multiwall carbon nanotubes. In them, needle-shape carbon clusters can be observed. Their diameters range approximately from 10nm to 30nm and some of them are longer than 1μm. Though the difference of diameter is related to the number of walls, it is not possible to find out how may walls these clusters have because of the low sensitivity of TEM imaging.

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