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Effects of Time Parameter in Pulse Plasma CVD on Narrow-Chirality Distributed growth of Single-Walled Carbon Nanotubes¹ BIN XU, TOSHIAKI KATO, TOSHIRO KANEKO, Department of Electronic Engineering, Tohoku University — Single-walled carbon nanotubes (SWNTs) are promising materials in industry application, since they have many brilliant characteristics. However, since the electronic and optical properties of SWNTs strongly depend on chirality, the selective synthesis of SWNTs with desired chiralities is one of the major challenges in nanotubes science and applications. In this study, time-controlled pulse plasma CVD has been developed aiming for the mass production of narrow chirality distributed SWNTs. Through the comparison of continuous plasma CVD and pulse plasma CVD, it is found that the amount of SWNTs can be increased in keeping with the initial narrow chirality distribution by repeating pulse plasma CVD. The effects of pulse time parameter, plasma off time, on the chirality distribution of SWNTs are also investigated. The chirality distribution becomes narrow with an increase in the plasma off time up to 60 sec, then it becomes broad with an increase in the off time. These indicate, adjustment of plasma time parameter in pulse plasma CVD can improve the uniformity of chirality distribution, resulting in the mass production of very narrow chirality distributed SWNTs.

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Bin Xu
Department of Electronic Engineering, Tohoku University

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