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Catalytic growth of single wall carbon nanotubes by laser vaporization and its purification and The carbon nanotube growth on the Si substrate by CVD method

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Direct laser vaporization of transition-metal(Co, Ni)/graphite composite pellet produced single wall carbon naotubes(SWNT) in the condensing vapor in a heated flow cylinder-type tube furnace. Transition metal/graphite composite pellet target was made by mixing graphite, Co, and Ni in 98:1:1 atomic weight ratios, pressing the mixed powder, and curing it. The target was placed in a tube furnace maintained at 1200°C and Ar inert collision gas continuously flowed into the tube. The 2nd harmonic, 532nm wavelength light from Nd-YAG laser was used to vaporize the target. The carbon nanotubes produced by the laser vaporization were accumulated on the quartz tube wall. The raw carbon nanotube materials were purified with surfactants(Triton X-100) in a ultrasonicator. These carbon nanotubes were analyzed using SEM, XRD, and Raman spectroscopic method.

The carbon nanotube growth on the Ni-patterned Si substrate was investigated by the CVD process. Transition-metal, Ni and CH₄ gas were used as a catalyst and a reactant gas, respectively. The structure and the phonon frequencies of the carbon nanotubes formed on the patterned Si substrate were measured by SEM and Raman spectrometer.