

Generation of SWNTs by Laser Oven Technique II

oRyosuke Kojima^a, Shohei Chiashi^a, Masamichi Kohno^b and Shigeo Maruyama^b

^aDept. of Mech. Eng. and ^bEng. Res. Inst., The Univ. of Tokyo

Since the discovery of single walled carbon nanotubes (SWNTs), they have attracted great interest from the viewpoints of both fundamental physics and potential applications, such as the field emission and the hydrogen storage. For more efficient and controlled production of SWNTs, it is necessary to understand the formation mechanism. We have implemented the laser-oven apparatus shown in Fig.1. Pulsed Nd:YAG laser was mildly focused to the metal-loaded graphite rod (Ni/Co 0.6/0.6 at. %) located in an electric furnace (temperature at 1100°C) in argon gas flow about 0.84 cm/s at typical pressure of 600 Torr. The TEM image in Fig.2 and the Raman spectrum in Fig.3 show existence of typical SWNTs about 1.2 nm in diameter. Various effects of experimental conditions on SWNT production will be discussed. For example, Fig.1 shows SEM images of soot at various positions around the furnace. These images show that SWNTs are predominantly formed at downstream positions, but some are formed even at the upstream positions.

We are trying to find and isolate the precursors of SWNTs.

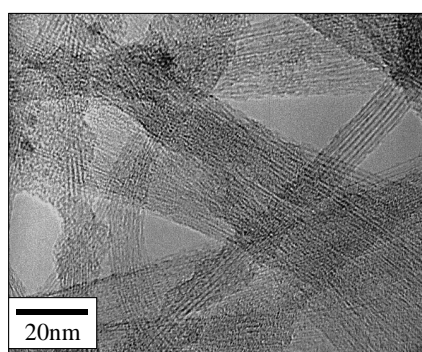


Fig. 2 TEM Image

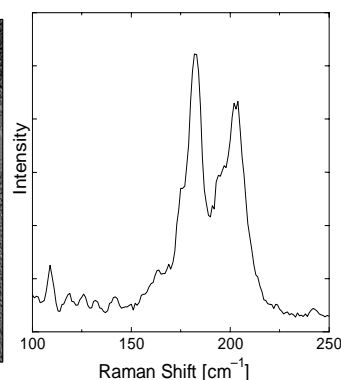


Fig. 3 Breathing mode

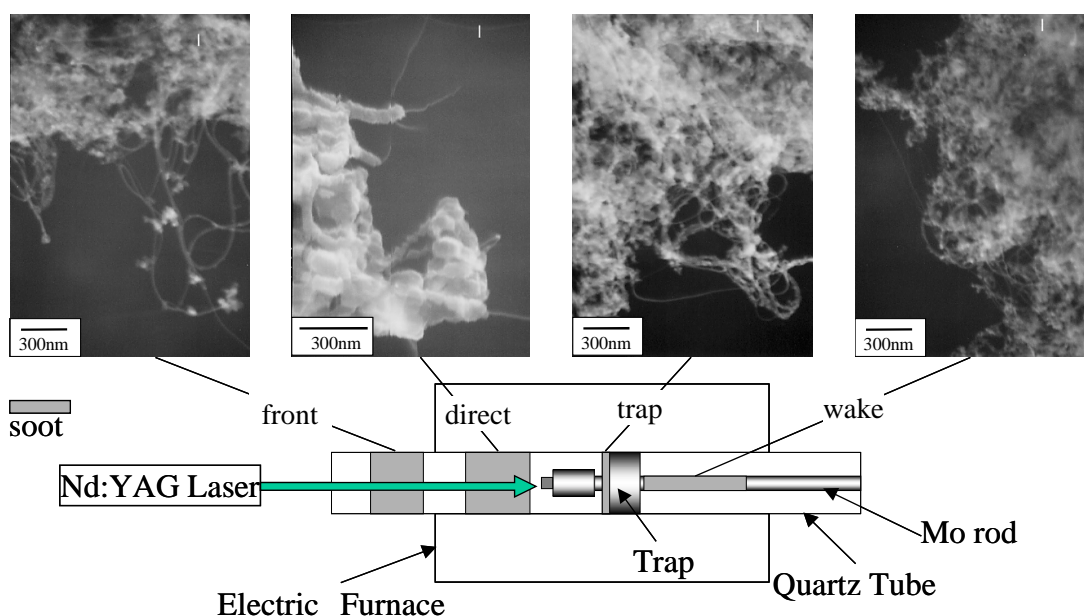


Fig. 1 SEM Images of soot at several positions