Controlling the distribution of Fe catalyst for the synthesis of carbon nanotube forest

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For the synthesis of carbon nanotube (CNT) forest on a Si wafer by chemical vapor deposition (CVD) method, it is generally the case that thin film of Fe is deposited as a catalyst. To control the properties of CNTs it is imperative to precisely control the distribution of Fe nanoparticles, since it affects the growth of CNTs. In this study, Fe films of various thicknesses from 0.5 nm to 5 nm were pretreated and the distributions of nanoparticles were examined. Temperature was elevated to various target temperatures ranging from 700 °C to 750 °C for 25 minutes with Ar gas, and then treated under different gas compositions of Ar, H2, and C2H2. Transmission electron microscopy (TEM) was employed to observe the distribution of Fe nanoparticles.