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## **Temperature dependent growth of carbon nanotubes**

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Vertically aligned carbon nanotubes are grown on iron deposited silicon substrates by thermal chemical vapor deposition of acetylene gas over the temperature range 800–1100 °C. The growth temperature increases from 800 to 1100 °C, the growth rate increases by 30 times and the average diameter also increases from 30 to 130 nm. The relative amount of crystalline graphitic sheets increases linearly with the growth temperature. From dependence of the growth rate, we estimated the activation energy of carbon nanotube growth as 30–40 kcal/mol, which is higher than the diffusion energy of carbon in bulk Fe, 13 kcal/mol. This result demonstrates that the growth rate, diameter, and crystallinity of carbon nanotubes can be controlled with the growth temperature. Furthermore, it first provides the kinetic data of the carbon nanotubes.