Growth of single-walled carbon nanotubes using iron oxide nanoparticles from iron-containing proteins

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Hemoglobin (Hb) was used as a catalyst for the growth of single walled carbon nanotubes (SWNTs). Hb was deposited onto hydrophilically treated substrate by spin coating method. After spin coating, the protein chains of Hb were removed by calcination in air so that only iron oxide nanoparticles remained on the substrates. The formation of iron oxide nanoparticle from Hb was confirmed by atomic force microscopy and transmission electron microscopy. The iron oxide nanoparticles obtained from iron-containing proteins were effective for the growth of SWNTs.