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The iron(II) phthalocyanine catalyzed pyrolysis of acetylene: aligned carbon nanotubes formation

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The iron(II) phthalocyanine catalyzed pyrolysis of acetylene was investigated. Vertically aligned carbon nanotubes have been massively produced by the iron(II) phthalocyanine catalyzed pyrolysis of acetylene at 800–1000 °C in an Ar / H₂ / C₂H₂ flow. Scanning electron microscopy, high-resolution transmission electron microscopy and Raman spectroscopy were used to characterize the aligned carbon nanotubes obtained. The aligned carbon nanotubes have high crystallinity. The growth rate of aligned carbon nanotubes was strongly dependent on the reaction temperature and the ratio of Ar / H₂ / C₂H₂. Our results show that this method can be used for a large-scale synthesis of aligned carbon nanotubes normal to a substrate surface.