

Consideration of Fe Nanoparticles and Nanowires Synthesized by Chemical Vapor Condensation Process

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Abstract

Various physical, chemical and mechanical methods, such as inert gas condensation, chemical vapor condensation, sol-gel, pulsed wire evaporation, evaporation technique, and mechanical alloying, have been used to synthesize nanoparticles. Among them, chemical vapor condensation(CVC) represents the benefit for its applicability to almost all materials because a wide range of precursors is available and large-scale production with a non-agglomerated state.

In this work, Fe nanoparticles and nanowires were synthesized by chemical vapor condensation(CVC) process, using iron pentacarbonyl($\text{Fe}(\text{CO})_5$) as precursor. The effect of processing parameters on the microstructure, size and morphology of Fe nanoparticles and nanowires were studied.

The Fe nanoparticles and nanowires have been successfully synthesized by chemical vapor condensation. By controlling the inflow quantity of metallic organic precursor, Fe nanoparticles with various diameter was obtained. Its have single crystalline. Also, Fe nanoparticles and nanowires were synthesized by controlling of inner pressure of electric furnace.