

## Effects of Catalyst Preparation on Multi-Walled Carbon Nanotubes Growth (137)

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### Abstract

The morphology, textural properties and particle size of the supported catalyst greatly affect the yield and quality of the resulting carbon nanotubes. In addition, the properties of the supported catalyst was dependent on the catalyst preparation method. In this work, alumina supported cobalt-ferrum catalysts were prepared using 3 different methods, namely hotplate (A), sonication (B) and wet impregnation (C). The alumina supported cobalt-ferrum catalysts were applied in the synthesis of Multi-Walled Carbon Nanotubes (MWNTs) using Catalytic Chemical Vapour Deposition (CCVD) technique. The morphology and particle size of the cobalt-ferrum catalysts before and after the MWNTs synthesis were examined by Field-Emission Scanning Electron Microscopy (FE-SEM) while the surface elemental composition of the samples was obtained by Energy Dispersive X-ray Analysis (EDX). From the FE-SEM micrographs, the morphology of catalysts A, B and C were found to be different, the particle sizes ranged from 20 – 50 nm. The diameters of the MWNTs yield from samples A, B and C were found to be related to the catalyst particle size. It was observed that the smaller the catalyst particle, the thinner the MWNTs obtained. The MWNTs with smaller diameter were obtained with higher purity and quality because the nanotube surface are free from amorphous carbon. Therefore different catalyst preparation methods resulted in different sizes of the catalyst particle in order to synthesis MWNTs with desired diameter.