

Abstract

Research into Carbon Nanotubes and their applications is fast becoming an extremely popular topic and any means to greatly improve the synthesis process has a huge marketability. An investigation was undergone to ascertain whether a Swirled-Fluid Chemical Vapour Deposition reactor could be used to continuously produce single-walled carbon nanotubes (SWCNT) in a feasible manner and, although the process proved successful, the mechanism of the SWCNT synthesis has not been fully understood. It was found that the use of a 10% Hydrogen to Argon mixture being passed through a 6.5mol% ferrocene-Xylene solution at 900°C resulted in the presence of Single Walled Carbon Nanotubes attached to Helical Carbon Nanotubes in the product stream exiting the hydro cyclones.

Investigation into the merits provided by the helical structure illustrated the greatly increased likelihood for helical tubes to be lifted from the reactor by the carrier gas giving rise to positive speculation of their possible use in vertical CVD reactors in the future. The increased drag and agglomeration provided by the helical shape provide a possible means by which grown nanotubes can be lifted from a vertical reactor in the future when more control over the products has been achieved. To its disadvantage contrarily, it was also found that the Swirled-Fluid Chemical Vapour Deposition reactor does require further separation of its products as, at present, produced samples still contain large amounts of unwanted material.