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**Producing carbon nanotubes from thermochemical conversion of waste plastics  
using Ni/ceramic based catalyst**

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**Abstract**

As the amount of waste plastic increases, thermo-chemical conversion of plastics provides an economic flexible and environmental friendly method to manage recycled plastics, and generate valuable materials, such as carbon nanotubes (CNTs). The choice of catalysts and reaction parameters are critical to improving the quantity and quality of CNTs production. In this study, a ceramic membrane catalyst (Ni/Al<sub>2</sub>O<sub>3</sub>) was studied to control the CNTs growth, with reaction parameters, including catalytic temperature and Ni content investigated. A fixed two-stage reactor was used for thermal pyrolysis of plastic waste, with the resulting CNTs characterized by various techniques including scanning electronic microscopy (SEM), transmitted electronic microscopy (TEM), temperature programmed oxidation (TPO), and X-ray diffraction (XRD). It is observed that different loadings of Ni resulted in the formation of metal particles with various sizes, which in turn governs CNTs production with varying degrees of quantity and quality, with an optimal catalytic temperature at 700 °C.

*Keywords:* Plastics waste; Carbon nanotubes; ceramic membrane; Nickel; catalyst

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