

The effect of metal loading on the performance of tri-metallic supported catalyst for carbon nanotubes synthesis from liquefied petroleum gas

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Abstrak

Carbon nanotubes (CNT) were synthesized from liquefied petroleum gas by a chemical vapor deposition method using a Fe-Co-Mo/MgO supported catalyst. Metal loading was varied from 2.5 to 20 wt%. The catalyst with metal loading of 10 wt% produced the highest CNT yield, at 4.55 g CNT/g catalyst. This high CNT yield was attributed to the high pore volume of the catalyst. The diameter of the CNT was quite variable: the outer diameter ranged from about 4 to 12 nm, while the inner diameter ranged from about 2 to 5 nm. The catalyst with 10 wt% metal loading produced CNT with the highest surface area and the largest total pore volume. XRD analysis detected the existence of highly oriented pyrolytic graphite, C(002), at $2\theta \approx 26^\circ$, which was attributed to the CNT.