

# Pengaruh laju alir gas oksigen dan waktu pretreatment oxidative heat treatment (OHT) stainless steel dalam produksi carbon nanotube (CNT) berbahan baku plastik polypropylene (PP) = Effect of oxygen's flowrate and time pretreatment of oxidative heat treatment (OHT) stainless steel to production carbon nanotube (CNT) with raw of plastik polypropylene (PP)

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## Abstrak

Penelitian ini menggunakan gas oksigen sebagai pengoksidasi dari gas hidrokarbon menghasilkan CO<sub>2</sub>, CO dan H<sub>2</sub>O, dimana gas-gas ini memiliki peranan terhadap pertumbuhan CNT dengan cara melakukan uji laju alir oksigen dalam proses sintesis CNT. Dan, penelitian ini juga melakukan variasi waktu pretreatment Oxidative Heat Treatment (OHT) katalis dalam sintesis CNT. Plastik Polypropylene (PP) diprolisis pada suhu 500 oC dan disintesis pada suhu 800 oC selama 1 jam. Kemudian, laju alir O<sub>2</sub> yang digunakan sebesar 33 ml/menit, 50 ml/menit dan 66 ml/menit (Sampel A, B, C) dengan waktu pretreatment OHT stainless steel (SS) 316 selama 1 menit. Kemudian melakukan uji waktu pretreatment (OHT) stainless steel (SS) 316 selama 1, 5, 10, 20 menit (Sampel A, D, E, F,) dengan laju alir gas oksigen yang digunakan 33 ml/menit. Dan karakterisasi CNT menggunakan alat XRD, TEM dan TGA. Diameter CNT yang dihasilkan Sampel A, B, C, D, E dan F adalah 9,46 nm, 16,84 nm, 33,93 nm, 12,34 nm, 11,39 nm, dan 15,74 nm. Produksi optimum sintesis CNT berada pada laju alir gas O<sub>2</sub> 33 ml/menit selama 1 menit pretreatment OHT SS dengan yield 9,9 %.

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This research using oxygen as oxidation of hydrocarbon to produce CO<sub>2</sub>, CO, and H<sub>2</sub>O which they are important for growth of CNT with variance of it flowrate. And, this research is to do variance of pretreatment time of catalytic. Oxygen to synthesis CNT. Plastik polypropylene (PP) is pyrolysed on temperature 500 oC and synthesized on temperature 800 oC during 1 hour. Then, flowrate of oxygen is used 33 ml/minute, 50 ml/minute, 66 ml/minute with long pretreatment stainless steel (SS) 316 during 1 minute. Then, next is to do variance of long pretreatment catalytic SS 316 during 1, 5, 10 and 20 minute. Then, characterization of CNT is using XRD, TEM and TGA. The result of outer diameter CNT from Sampel A, B, C, D, E dan F are 9.46 nm, 16.84 nm, 33.93 nm, 12.34 nm, 11.39 nm, and 15.74 nm. Optimum production is on flowrate of oxygen 33 ml/min during 1 minute of pretreatment OHT catalytic with 9.9 % yield.