



## **Studi Sintesis CuNWs menggunakan Metode Reduksi Kimia dan Fabrikasi Sensor Gas Heksana**

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### **INTISARI**

Telah dilakukan penelitian mengenai studi sintesis CuNWs menggunakan metode reduksi kimia dan fabrikasi sensor gas serta review aplikasi sensor CuNWs dan grafen beserta turunannya. Penelitian ini bertujuan untuk mensintesis secara kimia CuNWs dengan menggunakan metode reduksi kimia dan mempelajari fabrikasi dan sifat karakterisasi sensor gas berbasis CuNWs/PEDOT:PSS/MLG, rGO dan multi-layer grafen (MLG).

Sintesis CuNWs dilakukan dengan metode reduksi kimia, dengan mereaksikan  $\text{Cu}(\text{NO}_3)_2$ , NaOH, EDA dan hidrazin pada suhu  $60^\circ\text{C}$  selama 60 menit. Fabrikasi sensor gas berbasis CuNWs/PEDOT:PSS/MLG dilakukan dengan meneteskan larutan CuNWs keatas elektroda kemudian dipanaskan pada suhu  $150^\circ\text{C}$  selama 3 menit kemudian dilanjutkan dengan PEDOT:PSS dan MLG dengan cara yang sama. Cara tersebut digunakan pula untuk elektroda MLG dan rGO. Respons sensor terhadap gas heksana dijelaskan melalui output sinyal pada alat Keithley.

Sintesis CuNWs dengan metode reduksi kimia dapat dilakukan dengan cara mereduksi larutan  $\text{Cu}(\text{NO}_3)_2$  menggunakan hidrazin yang mengandung NaOH dan EDA. Dilakukan pula fabrikasi sensor gas heksana berbasis CuNWs/PEDOT:PSS/MLG, rGO dan MLG. Pada sensor gas heksana berbasis CuNWs/PEDOT:PSS/MLG menunjukkan respons sensor pada tiap variasi konsentrasi ialah 0.38%-100 ppm, 0.31%-200 ppm, 0.20%-300 ppm, 0.26%-400 ppm dan 0.21%-500 ppm.

Kata kunci: CuNWs, multi-layer grafen, MLG, rGO, sensor gas



***Study of CuNWS Synthesis using Chemical Reduction Method and Hexane Gas Sensor Fabrication***

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**ABSTRACT**

Research on the synthesis of CuNWs has been carried out using chemical reduction methods and fabrication of gas sensors as well as a review of applications of CuNWs and graphene sensors and their derivatives. This research aims to chemically synthesize CuNWs using chemical reduction methods and study the fabrication and characterization based of CuNWs/PEDOT:PSS/MLG, rGO, and multi-layer graphene (MLG) gas sensors.

Synthesis of CuNWs was carried out by chemical reduction methods, by reacting  $\text{Cu}(\text{NO}_3)_2$ , NaOH, EDA, and hydrazine at  $60^\circ\text{C}$  for 60 minutes. Fabrication of CuNWs/PEDOT:PSS/MLG gas sensors is carried out by dripping CuNWs solution onto the electrodes and then heated at  $150^\circ\text{C}$  for 3 minutes then proceed with PEDOT:PSS and MLG in the same way. This method is also used for MLG electrodes and rGO. The sensor response to hexane gas is explained through the signal output on the Keithley device.

Synthesis of CuNWs by chemical reduction methods can be done by reducing the solution of  $\text{Cu}(\text{NO}_3)_2$  using hydrazine containing NaOH and EDA. Fabrication of hexane gas sensors based CuNWs/PEDOT:PSS/MLG, rGO, and MLG is also carried out. On CuNWs/PEDOT:PSS/MLG hexane gas sensors show the sensor response at each concentration variation is 0.38% -100 ppm, 0.31% -200 ppm, 0.20% -300 ppm, 0.26% -400 ppm and 0.21% -500 ppm.

**Keywords:** CuNWs, gas sensors, graphene, multi-layer grafen, MLG, rGO