

INTISARI

Studi Pelapisan Elektroda Perak-Tembaga menggunakan *Copper Nanowires* dan *Graphite Flakes* sebagai Sensor Gas

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Pemanfaatan *graphite flakes* dan *copper nanowires* (CuNWs) sebagai material sensor yang dapat bekerja pada suhu ruang telah dilakukan untuk mendeteksi keberadaan gas VOC (*Volatile Organic Compounds*). Dalam penelitian ini *graphite flakes* dan CuNWs masing-masing diperoleh dari sintesis menggunakan metode *Hummer* yang dimodifikasi dan metode *aqueous solution*. Hasil karakterisasi *graphite flakes* menggunakan SEM-EDS menunjukkan lebar *flakes* bervariasi dan memiliki rasio C/O 3,4; TEM SAED menunjukkan jarak antar bidang 0,318 nm; dan *Raman Spectroscopy* menunjukkan *graphite flakes* terdiri dari banyak lapisan dan memiliki cacat struktur yang rendah. Hasil karakterisasi CuNWs menggunakan UV-Vis menunjukkan puncak absorbansi CuNWs dan SEM menunjukkan panjang dan diameter CuNWs yang bervariasi.

Fabrikasi sensor gas dilakukan dengan pelapisan material *graphite flakes* dan CuNWs-*graphite flakes* menggunakan metode *drop casting* pada permukaan elektroda Ag/Cu. Pengukuran tegangan sensor selama pengujian dilakukan menggunakan *Keithley*. Pengujian sensor menggunakan gas aseton, benzena dan heksana menghasilkan nilai respon yang bervariasi. Studi pelapisan ini menunjukkan bahwa penambahan material CuNWs pada *graphite flakes* dapat menambah sensitivitas sensor yang ditunjukkan dengan respon sensor yang lebih besar daripada sensor yang hanya menggunakan material *graphite flakes*.

Kata kunci : *Graphite flakes*, CuNWs, metode *Hummer*, *aqueous solution*, sensor gas, VOC, pelapisan.

ABSTRACT

Study of Coating Silver-Copper Electrode using Copper Nanowires and Graphite Flakes as Gas Sensors

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Utilization of graphite flakes and copper nanowires (CuNWs) as sensor materials that can work at room temperature has been done to detect the presence of VOC gas (Volatile Organic Compounds). In this study, graphite flakes and CuNWs were each obtained from synthesis using the modified Hummer's method and the aqueous solution method. The results of graphite flakes characterization using SEM-EDS showed that the width of the flakes varied and had a C / O ratio of 3.4; TEM SAED shows the distance between layer 0.318 nm; and Raman Spectroscopy shows that graphite flakes consists of many layers and has low structural defects. Whereas the results of CuNWs characterization using UV-Vis showed absorbance and SEM showed the length and diameter of CuNWs which varied.

Fabrication of the gas sensor is done by coating the graphite flakes and CuNWs-graphite flakes material using the drop casting method on the surface of the Ag / Cu electrode. Measurement of sensor voltage during testing is carried out using Keithley. Sensor testing using acetone, benzene and hexane gas produces varying response values. This coating study shows that the addition of CuNWs material to graphite flakes can increase sensor sensitivity which is indicated by sensor response that is greater than sensors that only use graphite flakes material.

Keywords : Graphite flakes, CuNWs, Hummer's method, aqueous solution, gas sensor, VOC, coating.