

Pengaruh gas karbon dioksida terhadap sensitivitas sensor gas amonia berbasis komposit hibrida zeolit nay/zsm-5 termodifikasi kation logam Cu²⁺ dengan metode impedansi = Carbon dioxide gas effect to the sensitivity of ammonia gas sensor based on nay/zsm-5 zeolite hybrid composite modified with metal cation Cu²⁺ using impedance method

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Abstrak

Zeolite modified electrode telah berhasil disintesis dan diaplikasikan sebagai sensor gas amonia. Pertama-tama, kuarsa dilapisi dengan lem perak dan emas guna meningkatkan sifat perekat antara kuarsa dan zeolit. Zeolit ZSM-5 dan NaY kemudian secara berturut-turut dilapisi di atas permukaan kuarsa dengan metode spin coating. Modifikasi kation logam Cu²⁺ dilakukan dengan teknik ion exchange dalam rangka meningkatkan sensitivitas sensor. Komposit hibrida zeolit diuji sebagai sensor gas amonia diukur dengan Electrochemical Impedance Spectroscopy EIS pada rentang frekuensi 1 MHz hingga 100 Hz untuk rentang konsentrasi amonia dari 0-500 ppm. Cu/NaY/ZSM-5/IDC bekerja secara optimal pada frekuensi 100 Hz dengan R₂ = 0,9696. Keberadaan uap air dan gas karbondioksida meningkatkan nilai konduktivitas material, tetapi tidak memberikan pengaruh yang berarti terhadap sensitivitas sensor. Dengan demikian, dapat disimpulkan bahwa komposit hibrida zeolit memiliki sensitivitas yang baik sebagai sensor amonia pada lingkungan sekitar.

.....Zeolite modified electrode has been successfully synthesized and applied as ammonia gas sensor. First, quartz was coated with silver glue and gold Au for increasing adhesive properties between quartz and zeolites. Each of ZSM 5 zeolite and NaY zeolite was coated on the surface of the quartz by spin coating method. Modification with metal cation Cu²⁺ was carried out by using ion exchange technique, in order to improve the sensitivity of the sensor. Zeolite hybrid composite was tested as ammonia gas sensor using Electrochemical Impedance Spectroscopy EIS in the frequency range of 1 MHz to 100 Hz with ammonia concentration range between 0 500 ppm. Cu NaY ZSM 5 IDC worked optimally at the frequency of 100 Hz with R₂ 0.9696. The presence of water vapor and carbon dioxide gas increases the conductivity of the material, but it has no significant effect to the sensitivity of the sensor. Thus, it can be concluded that zeolite hybrid composite has sensitivity as a good ammonia gas sensor in the ambient environment.