ABSTRAK

KARAKTERISTIK *QUARTZ CRYSTAL MICROBALANCE* BERLAPISKAN POLIVINIL ASETAT SEBAGAI SENSOR BENZENA, TOLUENA DAN XILENA

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Peningkatan pencemaran udara setiap tahunnya mendorong perkembangan metode identifikasi gas yang efektif dan efisien. Salah satu penyumbang polutan di udara adalah Benzena, Toluena dan Xilena (BTX). Dalam penelitian ini, sensor *Quartz Crystal Microbalance* (QCM) yang dilapisi nanofiber Polivinil Asetat (PVAc) terhadap konsentrasi uap Benzena, Toluena dan Xilena (BTX) serta dipelajari pula katakteristik dari sensor terhadap BTX. *Quartz Crystal Microbalance*-Polivinil Asetat (QCM-PVAc) telah dibuat pada penelitian sebelumnya menggunakan metode electrospinning. Dalam pengujian dilakukan injeksi cairan Benzena, Toluena dan Xilena secara bergantian. Dari injeksi cairan tersebut kemudian terbentuk uap Benzena, Toluena dan Xilena yang mana dapat dideteksi oleh QCM-PVAc dengan respon berupa frekuensi (f) yang ditampilkan oleh komputer. Besarnya perubahan Δf tersebut divariasikan terhadap konsentrasi dari Benzena, Toluena dan Xilena yang kemudian ditemukan bahwa sensitivitas dari sensor QCM-PVAc lebih peka terhadap Xilena yaitu 6,2 Hz/$\frac{mg}{L}$ 2 kali lipat sensitivitas Toluena dan 3 kali lipat sensitivitas Benzena. Waktu respon sensor terhadap uap BTX sensor QCM-PVAc memiliki daya ulang dan stabilitas yang baik ketika digunakan untuk deteksi Benzena, Toluena dan Xilena. Dalam rentang waktu 7 bulan respon frekuensi sensor QCM-PVAc terhadap Xilena mengalami penurunan respon sebesar 0,65 Hz.

Kata-kata kunci : QCM, PVAc, Benzena, Toluena dan Xilena.

ABSTRACT

CHARACTERISTICS OF QUARTZ CRYSTAL MICROBALANCE COATED WITH POLYVINYL ACETATE AS SENSOR OF BENZENE, TOLUENE AND XYLENE

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The escalation of air pollution in recent year encourages to the development of gas identification effectivity and efficiency methods. Some contributor to air pollutants is Benzene, Toluene and Xylene (BTX). in this study, Quartz Crystal Microbalance (QCM) sensor coated with Polyvinyl Acetate nanofiber (PVAc) were used to detect the vapor concentrations of Benzene, Toluene and Xylene (BTX) and the characteristics of sensor towards BTX. Quartz Crystal Microbalance-Polivinil Acetate (QCM-PVAc) were made in a previous study using the electrospinning method. Benzene, Toluene and Xylene liquids were injected one by one. From the injection of Benzene, Toluene and Xylene, vapors were formed from BTX liquids which can be detected by QCM-PVAc with a response in the form of frequency (f) displayed by computer. The change in Δ f is varied with the concentrations of Benzene, Toluene and Xylene which then the sensitivity of the QCM-PVAc sensor is more sensitive to Xylene that is equal to 6.2 Hz/$\frac{mg}{L}$ which is 2 times Toluene sensitivity and 3 times the sensitivity of Benzene. Beside sensor's sensitivity, the time response of sensor were studied to determine the time needed for sensor to give a saturated Δ f towards BTX vapour. In addition, the QCM-PVAc sensor has good repeatability and stability as Benzene, Toluene and Xylene sensor. Within a period of 7 months, the QCM-PVAc sensor's frequency response to Xylene decreased by 0.65 Hz.

Keywords : QCM, PVAc, Benzene, Toluene dan Xilene.