

INTISARI

Pengembangan Sensor Formaldehida Berbasis *Quartz Crystal Microbalance* Termodifikasi Lapisan Aktif Nanofiber Polivinil Asetat (PVAc) dengan Doping Anilin

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Sensor gas formaldehida berbasis *Quartz Crystal Microbalance* (QCM) telah berhasil dikembangkan. Pada penelitian ini, permukaan sensor QCM dilapisi nanofiber polivinil asetat (PVAc) didoping dengan berbagai konsentrasi anilin (An) 2, 4, dan 6% menggunakan metode elektrospinning. Morfologi dan kandungan kimia dari nanofiber yang dihasilkan dikonfirmasi oleh SEM-EDX dan spektrofotometri FTIR. Hasil penelitian menunjukkan bahwa nanofiber yang ditambahkan dengan anilin memiliki gugus N – H yang berperan untuk meningkatkan selektivitas dan sensitivitas sensor QCM. Sensor PVAc/An6 memiliki sensitivitas sebesar 0.056 Hz/ppm, yang jauh lebih tinggi daripada yang tanpa doping 0.022 Hz/ppm. Selain itu, PVAc/An6 selektif untuk deteksi formaldehida dalam bentuk gas atau uap lain termasuk etanol, metanol, etanal, aseton dan air. PVAc/An6 memiliki waktu pemulihan (*recovery*) yang singkat dan batas deteksi (LOD) masing-masing sebesar 90 detik dan 28.8 ppm.

Kata kunci: QCM; polyvinyl asetat; anilin; formaldehida; elektrospinning

**Development of Formaldehyde Sensor Based on Quartz Crystal
Microbalance Modified with Aniline-Doped Polyvinyl Acetate (PVAc) Active
Layer Nanofibers**

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ABSTRACT

A formaldehyde gas sensor based on Quartz Crystal Microbalance (QCM) has been developed. The QCM sensor surface was coated with polyvinyl acetate (PVAc) nanofiber doped with aniline (An) loading variations of 2, 4, and 6% by electrospinning method. The formed nanofibers were characterized by SEM-EDX and FTIR spectroscopy to analyze the surface morphology and elemental composition. The results showed that nanofiber added with aniline had N-H groups which played a role in increasing the selectivity and sensitivity of the QCM sensor. The PVAc/An6 improved the sensitivity to 0.056 Hz/ppm, much higher than the non-doped one of 0.022 Hz/ppm. In addition, PVAc/An6 was selective for formaldehyde detection over other gases or vapors including ethanol, methanol, ethanal, acetone and water. PVAc/An6 had a short recovery time and a detection limit of (LOD) of 90 s and 28.8 ppm, respectively.

Keywords: QCM; polyvinyl acetate; aniline; formaldehyde; electrospinning