

課題番号 : F-18-UT-0089
利用形態 : 機器利用
利用課題名(日本語) :
Program Title (English) : Parylene E-based MEMS gas sensor
利用者名(日本語) : 葉承翰, 鈴木雄二, 森本賢一
Username (English) : C.-H. Yeh, Y. Suzuki, K. Morimoto
所属名(日本語) : 東京大学大学院工学系研究科機械工学専攻
Affiliation (English) : Department of Mechanical Engineering, The University of Tokyo
キーワード/Keyword : リソグラフィ・露光・描画装置, Parylene, Gas Sensor

1. 概要(Summary)

For the detector use in micro gas chromatograph, the temperature effects on VOC-sensing performance of parylene E have been experimentally quantified. The sorption characteristics of parylene E are measured using chemicapacitive gas sensors under varied temperature condition. It is shown that the diffusivity of toluene-parylene E system at 70 °C is hundred times higher than that at the room temperature. The Flory-Huggins interaction parameter is estimated to ~ 0.8 , which corresponds to the larger partition coefficient of parylene E than that of PDMS.

2. 実験(Experimental)

【利用した主な装置】

高速大面積電子線描画装置, マスク・ウエーハ自動現像装置群, ステルスダイサー, ブレードダイサー

【実験方法】

Glass photomask is made using F5112+VD01. TEMPAX wafers are cut into chips by DISCO DAD3650 after standard photolithography. Silicon wafers are diced by DISCO DFL7340 after photolithography.

3. 結果と考察(Results and Discussion)

Figure 1 shows the temperature-dependent capacitance change of the present sensor with parylene E against 2000 ppm of toluene vapor. It is seen that the sorption response becomes faster with increasing temperature. At 70 °C, the dynamic response is improved by hundred times compared to

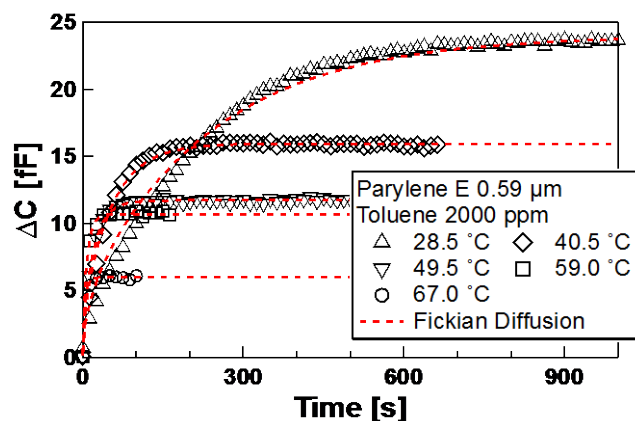


Fig. 1 Temperature-dependent dynamic response of a fringe-field type chemicapacitive sensor deposited with parylene E.

that at room temperature. The present performance is suited to μ GC application.

4. その他・特記事項(Others)

なし

5. 論文・学会発表(Publication/Presentation)

- (1) C.-H. Yeh et al., 55th Heat Transfer Symposium Japan, Sapporo, May 29, 2018.
- (2) K. Morimoto, 2018 IEEE International Conference on Cyborg and Bionic Systems (CBS 2018), Shenzhen, China, Oct. 26, 2018. (invited)

6. 関連特許(Patent)

なし