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THE KOREAN SENSORS SOCIETY

◀ SESSION B [세미나실 3] ▶

B1	Chemical Sensors / 09:00 – 10:15	
	Session Chair : 박종욱(한국과학기술원), 한상도(한국에너지기술연구원)	
09:00 – 09:15	A novel quartz resonator for simultaneously measuring changes in the mass and electrical resistance of absorbed gas on polyaniline film	
	Changyong Yim, Minhyuk Yun, Namchul Jung, and Sangmin Jeon	
	POSTECH	45
09:15 – 09:30	Preparation of highly selective and sensitive C ₂ H ₅ OH gas sensor using Fe-doped NiO hollow spheres	
	Hyo-Joong Kim, Kwon-Il Choi, Ji-Wook Yoon, and Jong-Heun Lee	
	Korea Univ.	46
09:30 – 09:45	Large area graphene-composite polymer film deposition process for gas sensing applications	
	Mitesh Parmar and Dong-Weon Lee	
	Chonnam National Univ.	47
09:45 – 10:00	Transparent gas sensors with self-activated ultrahigh chemosensitivity	
	Hi Gyu Moon ^{1,2)} , Hyo Jin Gwon ¹⁾ , Chong-Yun Kang ¹⁾ , Jin-Sang Kim ¹⁾ , Seok-Jin Yoon ¹⁾ , Hyung-Ho Park ²⁾ , and Ho Won Jang ³⁾	
	¹⁾ KIST, ²⁾ Yonsei Univ., ³⁾ Seoul National Univ.	48
10:00 – 10:15	High performance of silicon nanowire based ion-sensitive field-effect -transistor using a high-k stacked sensing membrane	
	Tae-Eon Bae, Hyun-June Jang, and Won-Ju Cho	
	Kwangwoon Univ.	49
B2	Bio Sensors 1 / 14:20 – 15:35	
	Session Chair : 김상재(제주대학교), 조원주(광운대학교)	
14:20 – 14:35	A study on the selectivity of MIP terpene sensors adding conductive polymer	
	Jaehun Jung and Sung Pil Lee	
	Kyungnam Univ.	50
14:35 – 14:50	Micromagnetic bead-based p-FET sensing platform for detection of Alzheimer's disease pathogenic factor	
	Chang-Beom Kim and Ki-Bong Song	
	ETRI	51
14:50 – 15:05	Emotion-on-a-chip (EOC) : Split-ring resonator to measure human salivary stress biomarkers	
	Jung-Hyun Lee, Hee-Jo Lee, Suji Choi, and Hyo-Il Jung	
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15:05 – 15:20	Proposal of unconstrained startle response measurement system for animal tinnitus detection and comparison of its results by acoustic stimulus patterns	
	Yunhwan Choe, Sunjoong Lee, Seung-ha Lee, and Ilyong Park	
	Dankook Univ.	53

가스 센서 활용을 위한 대면적 그래핀-복합 폴리머 필름 증착 공정 개발

미테스 파마, 이동원[†]

Large area graphene-composite polymer film deposition process for gas sensing applications

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Abstract

Replacing graphene (being almost defect free material) with conventional metal oxides improves the S/N ratio as well as detection limit of these sensors. However, due to small flake size of graphene limits the active sensing area and hence affects the sensor performance. In this scenario, graphene-composite helps to overcome the problem. Therefore in the present work, we are reporting the novel but simple process for the deposition of graphene-polyaniline (PANI) composite films for gas sensing application (Fig. 1). The process includes dissolving PANI to base solution of N-methyl-pyrrolidone (NMP) by ultrasonication and magnetic stirring. It was followed by 2M HCl treatment of the solution (which is described as additional HCl treatment), spin coating on piranha cleaned oxidized Si substrates and another 2M HCl treatment. For graphene-composite samples (1 mg/ml), graphene was added just before the additional HCl treatment. Basically two NMP solutions were prepared - polymer and graphene-composite polymer. It was further separated into four solutions, as one part was HCl treated in solution as well as spin coated sample and other treated only spin coated sample. These four samples (polymer and graphene-composite polymer samples with and without additional acid treatment) were studied for their electrical characterization as shown in Fig. 2 and their suitability as gas sensing application. The composite samples with additional HCl treatment possess 16 k Ω resistance values and exhibit more or less Ohmic characteristics even with Al metal electrodes which is one of the best suited material for electrodes in IC fabrication technology.

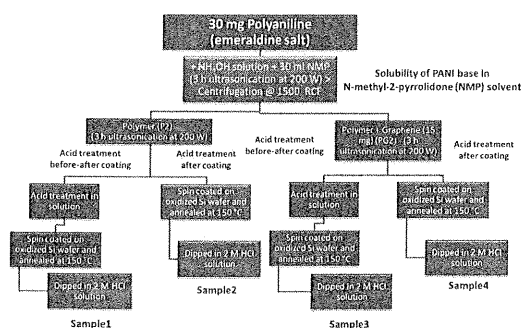


Fig. 1. General experimental steps performed in order to get polymer and composite polymer films.

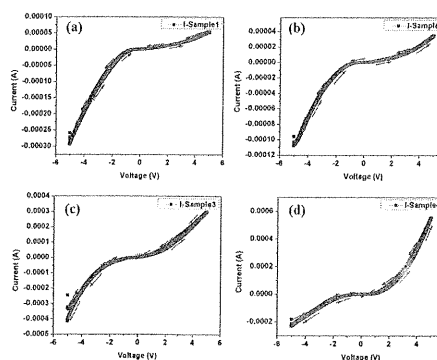


Fig. 2 I-V characteristics of (a)-(b) polymer samples and (c)-(d) composite polymer samples respectively.

Key Words : Graphene-composite polymer, Polyaniline, Gas sensing

References

- [1] J. Dai and J. Yuan, "Adsorption of molecular oxygen on doped graphene: Atomic, electronics, and magnetic properties", *Phy. Review B*, vol. 81, 165414, 2010.
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