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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)

B2 Bio Sensors 1 / 14:20 - 15:35

Session Chair : 김상재(제주대학교), 조원주(광운대학교)

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-pirrolidone (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 kΩ 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.

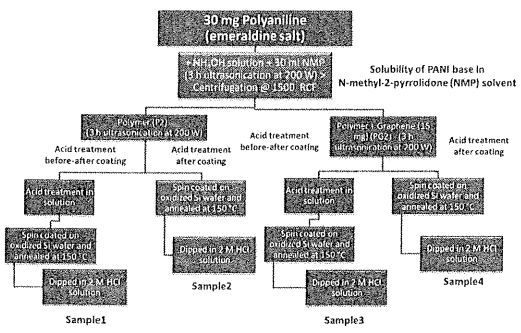

Fig. 1. General experimental steps performed in order to get polymer and composite polymer films.

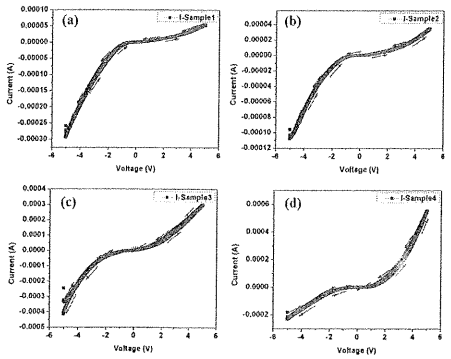

Fig. 2 I-V characteristics of (a)-(b) polymer samples and (c)-(d) composite polymer samples respectively.

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

References

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