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OPTICAL SENSING IN POLYMERIC MATERIALS

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ABSTRACT

In the present investigation, the polyaniline, a conducting polymer has been synthesized from aniline monomer by chemical polymerization method at a room temperature Polaniline e matrix .on PMMA substrate for optical sensing.

KEYWORDS: Conducting polymers; polyaniline, polymethyl methacrylate.

1. INTRODUCTION

polyaniline (PANI) - a conducting polymer may be deposited on substrates such as fibers, textiles, glass, gold, etc. and it can be used for chemical and biological sensing [1] conducting polymers to enhance speed, sensitivity and versatility in diagnostics of vital analytes. Conducting polymers provides a suitable matrix for the entrapment of enzymes [2]. Moreover, the polymer itself can be modified to bind protein molecule [3, 4]. There are various types of biosensors, useful in many fields but have found number of advantages in the fiber optic biosensor system [5] polymers such as polyanline,. have been considered as the material for immobilization of bio-component and provides good porous matrix for entrapment of enzymes [6, 7].polaniline has best sensing material for various organic vapors and hazardous gases [8].

2. EXPERIMENTAL

All chemicals used were of AR grade. Aniline and hydrochloric acid). An aqueous solution was prepared in deionized water. We have synthesized polyaniline (PANI) matrix at room temperature on PMMA substrate using chemical polymerization method. The polymerization of aniline (monomer) and ammonia per sulphate (APS) as an oxidant was performed in aqueous medium (deionized water) with inorganic dopant hydrochloric acid. Initially we have optimized the molar concentrations of aniline and oxidant. A suitable combination which shows good response has been selected for further synthesis. Then optimized molar concentrations i.e. aniline 0.1M and ammonia per sulphate (APS) 0.05M were used to synthesize the PANI matrix at room temperature by changing the dopant and its concentration for various duration of time 20 minutes. Aniline and ammonia per sulphate (APS) were separately dissolved in acidic media (do pant acid added in deionized water). The PMMA substrate was submerged in the (20 ml) reaction mixture of aniline and APS. After few minutes,

deposition takes place on the PMMA substrate.

3. RESULT AND DISCUSSION

The typical device structures using optical technique that can be used to measure the change in the properties of the polymeric matrix are the optical waveguides. These are based on the change of light propagation, absorption and or emission properties in the sensing polymer matrix and give an optical output signal: opt rode style, core based, coating based, sol gel, interferometric, and other types. The physical-chemical change takes place with the direct participation of the sensing polymer material. For most part, chemical, biochemical and biomedical sensors are examples based on sensing using the evanescent field [5]

4. CONCLUSION

Sensors rely on the interaction of light with the polyaniline matrix as optical sensing for fiber optical sensors

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REFERENCES

[1] Pirsa S., Asl A. A., Khani A., and Pur A., Fabrication of 1, 1-Dimethylhydrazine Gas sensor Based on Nano Structure Conducting Polyaniline, Journal of Sciences, Islamic Republic of Iran, 2013, 24(3), 209-215.

[2] Mehrvar M., Bis C., Scharer J. M., and Young M. M., Fiber Optic Biosensors- Trends and Advances Analytical Sciences, 2000, 16, 677.

[3] Kovacs B., Nagy G., Dombi R., and Toth K., Optical biosensor for urea with improved response time, Biosensors and Bioelectronics. 2003, 18, 111-118.

[4] Marazuela M. D., and Moreno-Bondi M. C., Fiber-optic biosensors – an overview, Anal Bioanal Chem., 2002, 372, 664-682.

[5] El-Sherif M., Bansal L. and Yuan J., Fiber Optic Sensors for Detection of Toxic and Biological Threats, Sensors, 2007, 7, 3100-3118.

[6] P.D.Gaikwad Gade V.K., Shirale D.J., Gaikwad P.D., Kakde K.P., Savale P.A., Kharat H.J., Pawar B.H. and Shirsat M.D., Development of PANI-PVS-GOD electrode by potentiometric method for determination of glucose Int. J. Electrochem. Sci., 1(2007).

[7] Gade V.K., Shirale D.J., Gaikwad P.D., Kakde K.P., Savale P.A., Kharat H.J., Pawar B.H. and Shirsat M.D., Synthesis and characterization of Ppy-PVS, P(NMP)-PVS and their co-polymer Ppy-P(NMP)- PVS films by galvanostatic method, Int. J. Electrochem. Sci., 2007, 2, 270 -277.

[8] M. R. Brie Turcu, C. Neamtu, S. Prupeanu, Sens. Actuat. B27, 119 (1996).