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VOC Detection Properties of Textile Sensors based on Conductive Polymer

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1. INTRODUCTION

In current textile industry, development about IT convergence textile is being important. In this reason, sensor material based on IT convergence textile technology is also being developed for commercialization. Especially growing an interest in environment, environmental sensor is being more importantly considered.

This study concentrated on examining VOC (Volatile Organic Compounds) detection properties for developing environmental textile sensor. In order to detect VOC, conductive polymers which can be used for IT convergence textile were applied on various base materials.

2. EXPERIMENTAL

Polyaniline and PEDOT[Poly (3,4-ethylendioxy-thiophene)-poly(styrene sulfonate)] were used as conducting polymer. Acetone was used as VOC.

Resistance change according to conducting polymer was measured, when organic solvent and water were repeatedly used to know if detecting VOC. Also differences of resistance change according to various base materials such as glass, polypropylene film, acetate, ester porous membrane and HDPE(high density polyethylene) with conductive polymer were compared.

3. RESULTS AND DISCUSSION

Resistance value of polyaniline and PEDOT applied on glass was analyzed, when acetone and water were repeatedly used. There was not distinct difference of resistance change in PEDOT, but polyanilin showed distinct difference of resistance change in Fig. 1. Polyaniline was chosen for environment sensor, as environmental sensors should be highly sensitive.

Resistance change according to various base materials with polyaniline was measured in Fig. 2. HDPE was the best base material, as HDPE had not only adequate difference of resistance change, but also durability to VOC, even though ester porous membrane had the highest difference of rate of resistance change because of instability about VOC when dried.

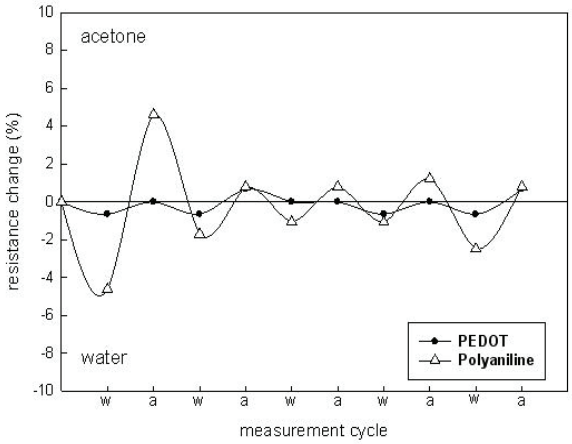

Fig. 1. Resistance change(%) of glass-PEDOT and glass-polyaniline according to water and acetone.

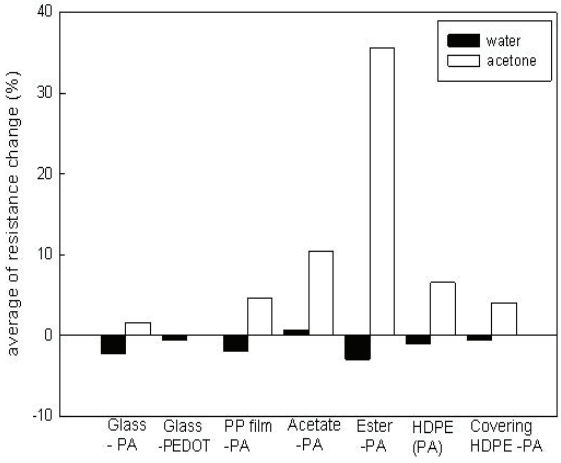

Fig. 2. Average of resistance change(%) according to conducting polymer and base material.

In conclusion, polyaniline-HDPE is effective for VOC sensor.