Dry Type Conducting Polymer Actuator Based on Polypyrrole–NBR/Ionic Liquid System

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The fabrication of dry type conducting polymer actuator was presented. In the preparation of actuator system, nitrile rubber (NBR) was used as a base material of the solid polymer electrolyte. Thin films of NBR (150 ~ 200 μm) were prepared by compression molding process. The conducting polymer, polypyrrole (PPy) was synthesized on the surface of NBR by chemical oxidation polymerization technique, and the room temperature ionic liquid, 1-butyl-3-methylimidazolium bis(trifluoromethyl sulfonyl)imide (BMITFSI) was introduced into the composite film. The cyclic voltammetry responses and the redox switching dynamics of PPy in NBR/ionic liquid solid polymer electrolyte were studied. The displacement of actuator was measured by laser beam.

Keywords: electro-active polymer; ionic liquid; NBR; polypyrrole

INTRODUCTION

Recently, Baughman [1] has reviewed the use of conducting polymers as artificial muscles and described potential applications including robotics and prosthetics. Many other workers have demonstrated...