

Accepted Manuscript

Title: Conducting Interpenetrating Polymer Network to Sense and Actuate: Measurements and Modeling

Author: Tien Anh Nguyen Chia-Ju Peng Kätlin Rohtlaid
Cédric Plesse Tran-Minh Giao Nguyen Frédéric Vidal
Shih-Jui Chen Luc Chassagne Barthélemy Cagneau



PII: S0924-4247(17)30987-1
DOI: <https://doi.org/doi:10.1016/j.sna.2018.01.067>
Reference: SNA 10622

To appear in: *Sensors and Actuators A*

Received date: 25-5-2017
Revised date: 8-1-2018
Accepted date: 31-1-2018

Please cite this article as: Tien Anh Nguyen, Chia-Ju Peng, Kätlin Rohtlaid, Cédric Plesse, Tran-Minh Giao Nguyen, Frédéric Vidal, Shih-Jui Chen, Luc Chassagne, Barthélemy Cagneau, Conducting Interpenetrating Polymer Network to Sense and Actuate: Measurements and Modeling, <![CDATA[Sensors & Actuators: A. Physical]]> (2018), <https://doi.org/10.1016/j.sna.2018.01.067>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Conducting Interpenetrating Polymer Network to Sense and Actuate: Measurements and Modeling

Tien Anh Nguyen^a, Chia-Ju Peng^{a,c}, Kätlin Rohtlaid^b, Cédric Plesse^b,
Tran-Minh Giao Nguyen^b, Frédéric Vidal^b, Shih-Jui Chen^c, Luc Chassagne^a,
Barthélemy Cagneau^{a,*}

^aUn. de Versailles Saint-Quentin / LISV, 10-12 Av. de l'Europe, 78140 Vélizy, France

^bUn. de Cergy Pontoise, 5 mail Gay Lussac / LPPI, 95031 Cergy-Pontoise Cedex, France

^cNational Central University, 300 Zhongda Rd., 32001 Taoyuan City, Taiwan

Abstract

This paper deals with conducting interpenetrating polymers networks (C-IPN). This class of polymers enables us to actuate and sense with the same material. It is of great interest when system integration or limited workspace are an issue. The C-IPNs allow for large displacements under low voltages (typically up to 5 V) with a reversible process. In this work, we are mainly interested in the modeling of the polymer because of its particular behavior. Experimental results are provided to better understand the behavior of the C-IPN. Based on these results, analytical functions are derived in order to predict both sensor and actuator voltage outputs with a good correlation regarding experimental data. These functions are required to use and control the C-IPNs for future applications.

Keywords: conducting polymers, soft robotics, soft sensors

1. Introduction

Actuators with integrated sensors to monitor the acting forces and movements are a challenging topic and might be useful for different kind of applications. The main challenge is to propose a single physical system with both

*Corresponding author

Email address: barthelemy.cagneau@uvsq.fr (Barthélemy Cagneau)

Download English Version:

<https://daneshyari.com/en/article/7133735>

Download Persian Version:

<https://daneshyari.com/article/7133735>

[Daneshyari.com](https://daneshyari.com)