

**P-193****ELECTRIC PROPERTIES AND FABRICATION OF IMI-O LB FILMS CONTAINING WITH IMIDAZOLE GROUP**  
**SEUNG-YEOP YOO and YOUNG-SOO KWON**

(Dept. of Electrical Eng., Dong-a Univ., Pusan, 604-714, Korea)  
JAE-CHUL PARK (Dept. of Elect., Yeugjin Junior Coll., Taegu, 702-020, Korea)

Poly(N-(2-4-imidazolyl)ethyl)maleimide-alt-1-octadecene (IMI-O) polymer which can complex metal ions, was used to confirm the possibility of molecular device made by Langmuir-Blodgett method. Metal / Insulator / Metal (MIM) device was fabricated for investigating electric properties of LB film which were complexes with metal ions. The experimental results were as following. In the  $\pi$ -A isotherms of IMI-O polymer, the surface pressure at collapse point have a difference due to the interaction between polymer and metal ions. The complex between metal ion and polymer could be verified through the investigation by Raman spectroscopy. In the I-V properties, the conductivity changes of IMI-O polymer complexes with metal ions couldn't be observed as to that kind. However, there were some changes in limiting area as to the concentration of the metal ions and the conductivity shift was increased with the occupied molecular area.

**P-194****ELECTORRHEOLOGICAL CHARACTERISTICS OF COPOLYANILINE SUSPENSIONS, J. W. KIM and H. J. CHOI** (Dept. of Polymer Sci. & Eng., Inha Univ., Incheon 402-751, Korea)

Suspensions of polarizable particles with insulating oils display dramatic changes in their rheological properties under a few kV/mm of electric field. The *electrorheological* (ER) fluids can be utilized for various application such as a clutch, a shock absorber, and an engine mount, etc. We have synthesized copolyaniline using aniline and *o*-ethoxyaniline monomer with various molar ratios such as 0, 0.25, 0.50, 0.75 and 1. ER fluids were composed of synthesized copolyaniline particles and silicone oil. These copolyaniline suspensions showed the typical ER behavior such as yield stress increase with electric fields and volume fractions. We characterized the shape, size and structure of the particles using FT-IR, SEM, NMR and TGA. Effects of both monomer ratio and conductivity of the copolymers on the ER properties were investigated. We further observed the temperature dependence on the rheological properties of the copolyaniline suspensions at constant electric field.

**P-195****CHARACTERISTICS OF SOL-GEL PROCESSED LiMn<sub>2</sub>O<sub>4</sub> THIN FILM FOR RECHARGEABLE MICROBATTERY, YONG IOON PARK, J. G. KIM, M. K. KIM, H. T. CHUNG\*, W. S. UM\*\*, and H. G. KIM**(Dept. Mat. Sci. and Eng., KAIST, 373-1 Kusong-dong, Yusong-gu, Taejon, 305-701, Korea)(\*Dept. Cer. Eng., Dong-Shin Univ. 252 Naju, Chonnam-Nam, 520-714, Korea)(\*\* KITECH-KTL, Seoul 152-053, Korea)

Recently, advances in the microelectronics industry and miniaturizations of electronic devices have made possible the use of thin film microbatteries as power sources. Spinel LiMn<sub>2</sub>O<sub>4</sub> thin film can be applied to cathodes of microbatteries because of their good characteristics. In this study, LiMn<sub>2</sub>O<sub>4</sub> thin films were deposited by sol-gel method using spin coator and spinel-phase LiMn<sub>2</sub>O<sub>4</sub> films were obtained through annealing treatment. The microstructure, capacity and rechargeability of LiMn<sub>2</sub>O<sub>4</sub> thin films were characterized by XRD, SEM, AFM and Electrochemical Analysis System.

**P-196****ELECTROCHEMICAL CHARACTERISTICS OF SnO<sub>x</sub> THIN FILMS FOR MICROBATTERY ELECTRODE PREPARED BY RF MAGNETRON SPUTTERING, HYUNCHUL SON, HEE-SOO MOON, SANG-HYUN SEONG AND JONG-WAN PARK** (Department of Metallurgical Eng., Hanyang Univ., Seoul 133-791, Korea)

Electrochemical characteristics of tin oxide films prepared by using rf magnetron sputtering method was investigated in 1M LiPF<sub>6</sub>-ethylene carbonate(EC) and dimethyl carbonate(DMC) solution during lithium insertion and extraction, by cycle tests, thin film x-ray diffractometry, fourier transformed infrared spectroscopy and x-ray photoelectron spectroscopy. The formation of Li<sub>2</sub>O in the first cycle is irreversible reaction with some capacity loss. However, it plays probably an important role in allowing the thin film electrode to contract and expand during the cycling process. In this study, the SnO<sub>x</sub>(X=0.5~2)films of various compositions were subject to various measurements of electrochemical characteristics. The relationships between irreversible capacity, cycle life and lithium oxide formation during the first cycle will be presented and discussed in detail.