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ALL-SOLID-STATE LITHIUM SECONDARY MICRO BATTERIES - ION CONDUCTIVE THIN SOLID POLYMER ELECTROLYTE FILMS PREPARED BY PLASMA POLYMERIZATION, INHO HAN, H. K. Baik (Dept. of Metallurgical Engineering, Yonsei Univ., Seoul, 120-749, Korea), S. M. Lee (Dept. of Materials Engineering, Kangwon National Univ., Chuncheon, 200-701, Korea)

This paper will report the properties of the thin solid polymer electrolytes, polymerized by plasma.

All-solid-state lithium secondary micro battery of total thickness less than 15μm was prepared. The thin film $LiCoO_2$ cathode and lithium metal anode were prepared by R.F. magnetron sputtering, and thermal evaporation, respectively.

Infra-red spectroscopy was used to investigate the structure of the electrolyte. Ionic conductivity was measured by 4-terminal DC method.

This paper has studied the properties of the thin solid polymer electrolytes such as the stable potential window, the ionic conductivity and the possibility for the lithium secondary micro battery.

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PREPARATION OF POLYANILINE/POLYETHYLENE OXIDE COMPOSITE AND ITS ENHANCED EELECTROCHEMCIAL STABILITY, Yongku Kang and Changjin LEE(Adv. Mat. Div., KRICT, Taejon, 305-606, Korea)

Polyaniline/polyethylene oxide (PEO) composite film was prepared by the solvent casting of the homogeneous solution of the polyaniline (PANI) and PEO in N-methyl-2-pyrrolidone (NMP). The conductivity of the dodecylbenzenesulfonate (DBS) doped PANI/PEO composite film was 0.01~0.1 S/cm depending on the contents of the PEO. Conductivity decreases as increasing the contents of PEO. The electrochemical reversibility of the film was investigated by means of the cyclic voltammograhpy in 0.1M $LiClO_4$ acetonitrile solution. The total charge for oxidation and reduction was gradually increased about 20% until 500th cycles. After 500th cycles, the total charge reached steady value and changed little up to 5000th cycles. The coulombic efficiency of the PANI/PEO composite was better than 95%. These enhanced electrochemical reversibility may be explained from the fact that the incorporated PEO assisted the movement of lithium ion in the film.[1), 2)] The PANI/PEO composite film may be useful as a cathode active material for the lithium-polymer battery.

1) H. Tsutsumi, S. Fukuzawa, M. Ishikawa, M. Morita and Y. Matsuda, *J. Electrochem. Soc.*, 142 (1995), L168.

2) H. Tsutsumi, S. Yamashita and T. Oish, *J. Appl. Electrochem.*, 27 (1997), 477.

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PHASE DIAGRAM AND OXYGEN-ION CONDUCTIVITY OF FLUORITE-TYPE SOLID SOLUTIONS IN THE Y_2O_3-Nb_2O_5 SYSTEM, Jin-Ho Lee, Masatomo Yashima, Masato Kakihana, and Masahiro Yoshimura (Materials & Structures Lab., Tokyo Inst. Tech., 4259 Nagatsuta, Midori, Yokohama 226-8503, Japan)

The phase equilibria in the Y_2O_3-Nb_2O_5 system have been studied at temperatures of 1500 ℃ and 1700 ℃ in the compositional region of 0-50 mol% Nb_2O_5. The solubility limits of the C-type Y_2O_3 cubic phase and the $YNbO_4$ monoclinic phase are 2.5 ($\pm$ 1.0) mol% Nb_2O_5 and 0.2 ($\pm$ 0.4) mol% Y_2O_3, respectively, at 1700 ℃.

The fluorite (F) single phase exists in the region of 20.1-27.7 mol% Nb_2O_5 at 1700 ℃, and in the region of 21.1-27.0 mol% Nb_2O_5 at 1500 ℃, respectively. Conductivity of the Y_2O_3-x mol% Nb_2O_5 system increases as the value of x increases, to a maximum at x = 20 in the composition region of $0 \leqq x \leqq 20$, as a result of the increase in the fraction of F phase. In the F single-phase region, the conductivity decreases in the region of 20-25 mol% Nb_2O_5, because of the decrease in the content of oxygen vacancies, whereas the conductivity at x = 27 is larger than that at x = 25. The conductivity decreases as the value of x increases in the region of $27.5 \leqq x \leqq 50$, because of the decrease in the fraction of F. The 20 mol% Nb_2O_5 sample exhibits the highest conductivity and a very wide range of ionic domain, at least up to log P_{O_2} = -20 (where P_{O_2} is given in units of atm), which indicates practical usefulness as an ionic conductor.

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OPTICAL PROPERTIES OF THE SELF-ASSEMBLED MoS_2/π-CONJUGATED POLYANILINES LAYERED THIN FILMS FOR ELECTROLUMINESCENT DEVICES, E. BUZANEVA, S. NEDELKO, A. GORCHINSKYI, V. MOTSNYI, (Physics Dept., Taras Shevchenko Kyiv University, 6 akad. Hlushkova Ave., 252022 Kyiv, Ukraine), N. KOVTYUKHOVA, Institute of Surface Chemistry, 31, Nauki Ave. 252028 Kyiv, Ukraine)

The main goal of the presented work is investigation of borders of complex semiconductors with polymers. The layered MoS_2/π-conjugated polyanilines thin films were obtained by the consequent sublimation of the single molecular layers on the ITO/Glass substrate. Created nanocomposites layers were characterized by X-ray diffraction, optical absorption, conductivity, scanning tunneling microscopy, Raman spectroscopy and x-ray photoelectron spectroscopy. Formation of the layer with the E_g = 1.4 eV was established and the photoluminescence in the visible region was observed. The photoluminescence spectra operation reached up by the changing π-conjugated layer width.

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