STRUCTURAL, ELECTRICAL AND THERMAL STUDIES OF POLYETHYLENE BASED SOLID POLYMER ELECTROLYTES

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Puan Ri Hanum Yahaya Subban
Pensyarah
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SHAH ALAM

Puan,

KELULUSAN PERUNTUKAN BAGI MEMBIAYAI PROJEK-PROJEK SCIENCEFUND DI BAWAH RMKe-9 *CYCLE* 1/2006

Dengan hormatnya perkara di atas adalah dirujuk.

Dimaklumkan Jawatankuasa Kelulusan MOSTI telah mempertimbangkan permohonan puan untuk membiayai projek penyelidikan di bawah dana ScienceFund *Cycle* 1/2006 pada 20 Oktober 2006.

Sukacita dimaklumkan bahawa projek penyelidikan puan telah pun diluluskan oleh Jawatankuasa tersebut. Walaubagaimanapun puan diminta untuk mengambil perhatian atas ulasan yang diberikan oleh Jawatankuasa dalam bahagian Catatan.

Puan juga dikehendaki untuk mengemukakan *Research Agreement* (RA) atau *Memorandum of Understanding* (MoU), yang mana berkenaan, yang telah ditandatangani kepada IRDC dalam tempoh 3 hari dari tarikh terima surat ini. Dokumen RA / MoU boleh dimuat turun dari laman web eScienceFund.

Pembiayaan keseluruhan yang diluluskan adalah seperti berikut:

Kod Projek	Tajuk	Ketua Projek	Tempoh Projek (Bulan)	Peruntukan Keseluruhan (RM)	Catatan
03-01-01-SF0035	Development Of Nanocompocite Solid Polymer Electrolyte Films	Ri Hanum Yahaya Subban	24	169,500	N/A

Sehubungan dengan itu juga kami mengucapkan tahniah kepada puan kerana berjaya mendapatkan peruntukan E-Science ini dan semoga berjaya menyiapkan projek penyelidikan ini dengan cemerlang.

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5. Report

5.1 Proposed Executive Summary

Polymer based solid electrolytes are ionic conductors. As such the mechanism of ion transport through them depends on the type of polymer used as well as otjer components such as plasticisers or fillers. The transport mechanism in these materials can be quite complex. Different theoretical models could be employed to understand the conduction mechanism of polymer electrolyte. Rice and Roth model, quantum mechanical tunneling (QMT) model, correlated barrier hopping (CBH) model and overlapping large polaron tunneling (OLPT) model. The Rice and Roth model is based on the hypothesis that in an ionic conductor there is an energy gap E above which conducting ions of mass M can be thermally excited from localized ionic states to free ion-loke states in which an ion propagates throughout the solid with a velocity $v = (2E/M)^{1/2}$. From Rice and Roth model, the conductivity is given by $\sigma = 2/3\ [(Ze^2)/kTM]\ln E\tau \exp(-E/kT)$, where τ is the time to travel between two complexation sites, e is the electronic charge n is the density of free ions, k is Boltzmann constant and T is the absolute temperature. τ could be obtained by dividing the distance between the two complexation sites by the velocity of the ion obtained by equating the translational kinetic energy of the ion to the activation energy, E_a. Thus the number of free ions n can be calculated. The calculated values of n can then be used to calculate the ionic mobility μ using equation $\sigma = nq\mu$. Thus the number the values of n and μ could be used to analyse quantitatively the conductivity behavior and transport mechanism of polymer electrolyte. On the other hand the QMT, CBH and OLPT models are used to interpret the temperature dependence conductivity behavior of polymer electrolytes.

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