

**INVESTIGATION ON ELECTRICAL PROPERTIES OF COMPOSITED
PVA/PVP ELECTROLYTES**

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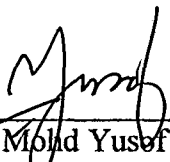
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This Final Year Project Report entitled “**Investigation on Electrical Properties of Compositd PVA/PVP Electrolytes**” was submitted by Noor Asyira Binti Ab Razak, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Physics, in the Faculty of Applied Sciences, and was approved by




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ABSTRACT

Alkaline solid polymer blend electrolytes (ASPBE) have been prepared using solution casting technique. It consists of a blend of polyvinyl alcohol (PVA) and polyvinyl pyrrolidone (PVP), potassium hydroxide (KOH) as ionic dopant and silicon dioxide (SiO₂) as nanofiller. The weight percent ratio of the polymer blend and ionic dopant was fixed (80 wt% of PVA, 20 wt% of PVP and 40 wt% of KOH). The addition of SiO₂ as nanofiller was varied from 1-15 wt%. The electrical properties have been characterized by impedance spectroscopy to investigate the ionic conduction in blending PVA/PVP-KOH-SiO₂ electrolyte systems. The conductivity is found to increase in the order of 10⁻⁴ to 10⁻¹ Scm⁻¹ with the increase in nanofiller concentrations at various temperatures from 25 °C to 100 °C. The composition of 14 wt% of SiO₂ exhibits the highest conductivity of 1.65 x 10⁻⁰¹ Scm⁻¹ when added to PVA/PVP-KOH. The plot of conductivity at temperature dependence indicates that the samples obey the Arrhenius rule which describing the hopping mechanism of charge carrier. Activation energies have been determined and show the consistency with the conductivity. The dielectric permittivity studies show that the conductivity decreases exponentially due to increase in frequency. In addition, the appropriate model of composite SPE has been estimated. The exponent *s* plot is almost independent with the frequency indicates that the composite SPE follows Quantum Mechanical Tunneling (QMT) model which due to charge carrier hopping mechanism.