

**FACULTY OF ENGINEERING
UNIVERSITI MALAYSIA SABAH**

**THE EFFECT OF DIPHENYLMETHANE
DIISOCYANATE AS THE CROSSLINKING
AGENT FOR POLYETHYLENE GLYCOL AS A
QUASI-SOLID STATE ELECTROLYTE ON THE
DYE-SENSITIZED SOLAR CELL SYSTEM**



**PROF. MADYA DR. RACHEL FRAN MANSA.
PROF. MADYA DR. COSWALD STEPHEN
SIPAUT
DR. MOHD WAN KAMEL IBRAHIM**

**PERPUSTAKAAN
UNIVERSITI MALAYSIA SABAH**

**FINAL REPORT
UMS SCHEME RESEARCH GRANTS
SBK0146 – TK - 2014
MAC 2014**

ABSTRACT

The dependency on fossil fuel have reach the limit as it exhaustion is inevitable and imminent in this century. Many research works have been carried out to replace this non-renewable energy source with the renewable energy source. One of the most attracted renewable energy source is solar energy because it directly converts solar energy into electrical power and leave no environmental effects. However, high conversion rate of silicon based solar cells, high module cost and complicated production process restricted their application. So, researchers have come out with organic solar cells, that is dye-sensitized solar cells (DSSCs). Polyethylene glycol (PEG) and diphenylmethane diisocyanate (MDI) were used as photo-crosslinkable polymer electrolytes for dye-sensitized solar cells (DSSCs). PEG and MDI formed a crosslinked structure, as conformed by the FTIR spectroscopy. Different ratios of MDI were used for electrolyte formulation, 10wt%, 15wt% and 20wt% MDI. The electrolyte containing PEG with 15wt% MDI showed a higher photo-conversion efficiency, that is 0.009%, with fill factor 0.572 and Voc is 238.5 mV and the average efficiency for 5 days experiments is 0.0023%. Also, the DSSCs with crosslinkable PEG/MDI based polymer electrolyte showed long-term stability compared to liquid electrolyte.