**PREPARATION OF DYE-SENSITIZED SOLAR CELLS USING FLOATED GRAPHITE/GRAPHENE COMPOSITE FILM AS A COUNTER ELECTRODE**

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The solar energy is an abundant, continuous and clean source of an energy that can be used to produce electricity using many different photovoltaic designs. Dye-sensitized solar cells (DSCs) based on TiO2 have drawn attention worldwide due to their low cost and easy preparation techniques compared to conventional silicon based photovoltaic devices. DSCs mostly use lightly-platinized fluorine-doped tin oxide (Pt-FTO) counter electrodes (CEs) and hence the use of platinum adds a high cost to the DSC device. To overcome this problem, it is desirable to search for low-cost alternative materials for platinum that have high catalytic activity towards triiodide reduction. Under this work, instead of platinum (Pt) low-cost, screen printed composite material comprising graphene and floated graphite mixture was used as CE for DSCs. Graphene was prepared by Sri Lankan vein graphite using Modified Hummer’s method and floated graphite was also prepared by Sri Lankan vein graphite. In the preparation of composite counter electrodes, first floated graphite and graphene powder (1:1) water, ethanol and organic binder carboxylic methyl cellulose (CMC) were ground well in a mortar. Then, the paste was screen printed on a FTO glass plate and sintered at 300°C for 30 min. The highly porous Ti, film was prepared, on a FTO glass plate by spraying the TiO2 colloidal solution using spray pyrolysis method at 150°C for 30 minutes to a thickness of 12-14 µm. Then, the mesoporous TiO2 film was soaked in a 0.30 mM solution of ruthenium dye N719 in an anhydrous ethanol for 12 hours. The working electrode (WE) and CE were assembled by sandwiching the electrolyte I-/I-3 as the redox couple. The current density-voltage (J-V) measurements of the DSCs were recorded under the illumination of halogen light source. In order to get the maximum power conversion efficiency, the floated graphite, graphene compositions of the counter electrodes and the thickness of the composite film were optimized. The best conversion efficiency of 5.51% was obtained for composite counter electrode with 1:1 ratio composition with thickness of 60 μm of the composite film. This efficiency was a result of contributions from a short-circuit current density of 11.10 mA cm-2, fill factor of 0.66 and an open circuit voltage (Voc) of 750 mV. The DSC fabricated using usual FTO-Pt counter electrode gave an efficiency of 8.09% with a short circuit current density of 14.31 mA cm-2,fill factor of 0.74, open circuit voltage (Voc) of 759 mV.