

MOBILITY OF PHOTO-INJECTED CARRIERS IN DYE-SENSITIZED SOLAR CELL.

SPH 607: PROJECT

By

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I56/8111/2006

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MSc. Project submitted to the department of physics as a partial fulfillment  
for the award of the Degree of Masters of Science in School of Physical  
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July 2008

**DECLARATION**

This project is my original work and has not been presented for a degree to any University.

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This project has been submitted for examination with the approval of my university supervisors.

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### Abstract

This work focuses on the mobility of electrons once it's injected into the conduction band of  $\text{TiO}_2$  in an open circuit conditions. The three possible back reaction pathways namely via substrates, surface states and conduction band have been discussed. The current models being used to describe carrier transport in semiconductor devices have been adapted for this work. To improve our understandings on the mobility of electrons in the dye sensitized solar cell, this work focuses specifically on two aspects expected to influence the mobility of electrons properties; these are temperature and photon flux. Due to lack of time it was not possible to carry out computer simulation of the equations. However the approach was purely analytical. The back reaction via the substrate is dominant at low temperatures while the electron losses via the conduction band and the surface states have been noticed to be dependent on the thickness of  $\text{TiO}_2$  particles.