



Sudan University of Science and Technology
College of Graduate Studies

**Measurement of the Spectral Response of
Silicon Solar Cell with a Set of Filters**
**قياس الاستجابة الطيفية لخلية شمسية سيليكونية بمجموعة
مرشحات**

**A dissertation Submitted as Partial Fulfillment of the Requirements for the
Degree of Master of Science in Physics.**

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الآية

قال تعالى:

(وَسَخَّرَ لَكُمْ الشَّمْسَ وَالْقَمَرَ دَائِبِينَ^ط وَسَخَّرَ لَكُمْ اللَّيْلَ وَالنَّهَارَ)

إبراهيم (33)

Dedication

I dedicate this research to my parent, who gave me and brought me with their love

Let me say to them you who give life, hope and brought to read and have knowledge.

To my brothers and sisters

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I would like to thank my supervisor **Dr. Ali Abdel Rahman Saeed Marouf** for his continues follow up and encouraging during this work.

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And thanks for all my teachers at Sudan University of Science and Technology.

Abstract

This master dissertation describes the measurements of the spectral response of silicon solar cell with a set of filters. A solar cell of mobile phone charger was used with a set of six different filters, the tungsten lamp is used as a light source to illuminate the filters. The spectral responsivity on the visible range of such solar cell had been measured.

The results obtained show that the best spectral band will be used in this cellular cell to a mobile phone charger is the green band with high efficiency. In contrast, the violet and blue bands showed low response and efficiency. Yellow band shows a low response with high efficiency, while orange and red bands showed high response but its efficiency was very low.

المستخلص

توصف أطروحة الماجستير هذه قياسات الاستجابة الضوئية للخلية السيليكونية باستخدام مجموعة مرشحات ضوئية. تم استخدام خلية شمسية لشاحن جوال ومجموعة مكونة من ستة فلاتر مختلفة, تم استخدام مصباح التنجستين كمصدر ضوئي لتوجيه الضوء على الفلاتر. حيث تم قياس الاستجابة الضوئية لهذه الخلية في المدى المرئي.

أظهرت النتائج أن أفضل حزمة طيفية يجب استخدامها للخلية الشمسية لشاحن الجوال الخلوي هذا هي حزمة الضوء الأخضر بكفاءة عالية. بالمقابل أظهرت الحزمتين الضوئيتين البنفسجية والزرقاء أقل استجابة وأقل كفاءة. بينما أظهرت الحزمة الصفراء استجابة ضعيفة وكفاءة عالية, في حين أظهرت الحزمتين البرتقالية والحمراء استجابة عالية ولكن بكفاءة ضعيفة جداً.

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