بسم الله الرحمن الرحيم

قال تعالي:

نُورِهِ اللَّهُ "مَثَلُ نُورِهِ كَمِشْكَاةٍ فِيهَا مِصْبَاحٌ الْمِصْبَاحُ فِي زُجَاجَةٍ الزُّجَاجَةُ
شَجَرَةٍ مُبَارَكَةٍ زَيْتُونَةٍ لَا شَرْقِيَّةٍ وَلَا غَرْبِيَّةٍ يَكَادُ زَيْتُهَا يُضِيءُ وَلَوْ
لَمْ تَمْسَسْهُ نَارٌ نُورٌ عَلَى نُورٍ يَهْدِي اللَّهُ لِنُورِهِ مَنْ يَشَاءُ وَيَضْرِبُ اللَّهُ الْأَمْثَالَ لِلنَّاسِ وَاللَّهُ بِكُلِّ
شَيْءٍ عَلِيمٌ "

صدق الله العظيم

(سورة النورالآية (35))

Dedication

Dedicated to my mother whose I love dearly and owe everything.

To all my great teachers.

To all colleagues, friends, and everyone who helped.

Marwa

Acknowledgement

I would like to thank God for helping me and giving me life, health and time to accomplish this work .thanks to Sudan University of Science and Technology – Institute of Laser for giving me the opportunity to present this work .

I extend my gratitude to my supervisor Dr. Ali A. AlrahmanSaeedMarouf who gave me much useful advice and support which has encouraged me throughout this whole process.

I would like to thank Mrs. Mohammed Baba for his helping me in the experimental part of this work and thanks to all teachers in Institute of laser(SUST) and its Dean Dr. Faiz Mohammed BudrElshafiaand to everyone who have helped me with his valuable advice and efforts.

Last but not least, I wish to thank my parents for being there, make me strong than I would be without you.

Abstract

Solar energy is rapidly becoming one of the most promising renewable energy sources available to us. This work aimed tomodifythe surface of mono crystalline silicon solar cell.Texturing of semiconductor surface can be utilized to capture as much of the incident light as possible to decrease reflection and increase absorption to enhanced device performance without altering the bulk properties. Laser Direct Writing technique was used to achieve the texturing results, that's based on the interaction between ultra shortpulses of CO_2 laser (10.6μm) and silicon used for solar cells. An increase in short circuit current by 75.1% and efficiency by 50% was observed.

مستخلص

الطاقة الشمسية سرعان ما أصبحت واحدة من مصادر الطاقة المتجددة والواعدة المتاحة .يهدف هذاالبحثالى تعديل سطح الخلية الشمسيةالسيلكونيةأحادية التبلور. استخدام تغيير النسيج لسطح شبة الموصل يؤدي الى إلتقاط أكبر قدرممكن من الضوء الساقط لتقليل الانعكاس وزيادة الامتصاص وذلك لتعزيز أداء الجهاز دون تغيير في خصائص المادة .استخدمت تقنية الحفر المباشر بالليزر لتحقيق النتائج والتي تعتمد على التفاعل بين نبضات قصيرة جدا من ليزر ثاني أكسيد الكربون النبضي بطول موجة (10.6ميكرميتر) و السيليكون المستخدم في الخلايا الشمسية. أظهرت النتائج زيادة في تيار دائرة القصر بنسبة 75.1% وفي الكفاءة بنسبة 50 % .

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