

Dedication

I dedicate this effort to my father....

To my mother.....

To my brother

To my wife.....

To my sister's soul.....

To my son's soul.....

To all my family.....

To my friends.....

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Abstract

Polymer solar cells are one of the promising alternative energies which can be easily manufactured with low cost. In this work polymer cells with different thicknesses and three different type of organic dyes (Rhodamine 6G, Coumarin 500 and Dibenzocyanin 45) are fabricated. The effect of the concentration of different organic dye on various electrical and optical properties of the samples produced has been studied. It was found that when the conjugate polymer layer deposition on the slides at low speeds by spin coating technique (increasing the thickness of the conjugate polymer layer), results in higher efficiency of the cells. The use of the organic dye (DDTTCI) led to improved in efficiency and absorption coefficient of light in the samples. In addition, the optical absorption spectra were recorded for those samples with a UV-VIS spectrophotometer (model: UV mini-1240) within the wavelength range of 200–800 nm, at room temperature. The samples show variations in absorption coefficient which depending on the type of organic dye used as well as the concentration of conjugate polymer. The short-circuit current, open circuit voltage and the fill factor of each sample have been calculated. The efficiency was found in the range of 10.28-1.744% for designed samples.

المستخلص

تعد الخلايا الشمسية البوليمرية إحدى الطاقات البديلة الواعدة التي يمكن تصنيعها بسهولة وبتكلفة إنتاجية منخفضة. في هذا العمل تم تصنيع خلايا بوليمرية مختلفة السمك باستخدام ثلاثة أنواع من الأصباغ العضوية (Rhodamine 6G, Coumarin 500 , Dibenzocyanin 45). وتمت دراسة تأثير تركيز الصبغات العضوية المختلفة على الخصائص الضوئية والكهربائية للعينات المنتجة. كما تم التوصل إلى أنه عند ترسيب طبقة البوليمر المتعدد الإقتران على الشرائح بسرعات منخفضة بواسطة تقنية الطلاء الدوار (زيادة سمك طبقة البوليمر المقترن) فإن الكفاءة الناتجة للخلية تكون عالية. كما وجد أنه عند استخدام صبغة الـ (DDTTCI) أدت إلى تحسين الكفاءة و الإمتصاصية للضوء في جميع العينات. أيضا لتلك العينات سجل طيف إمتصاص العينات للضوء بواسطة جهاز قياس الطيف بالأشعة فوق البنفسجية (نموذج UV mini-1240) له المدى الموجي 200-800nm في درجة حرارة الغرفة. أظهرت العينات تبايناً في معامل الإمتصاص حسب نوع الصبغة المستخدمة وعلى درجة تركيز البوليمر المقترن. قمنا بحساب كل من تيار الدائرة القصيرة ، فولتية الدائرة المفتوحة و معامل الملء لكل العينات. تم الحصول على كفاءة تحويلية للعينات المصنعة بين % 1.744 – 10.28 .

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