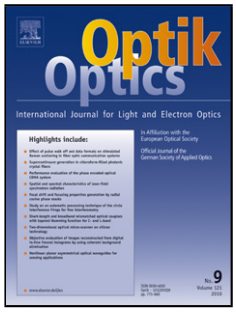

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One diode circuital model of light soaking phenomena in Dye-Sensitized Solar Cells

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In this work, we report on the modelling of light soaking effect on Ruthenium-based Dye Sensitized Solar cells (DSSCs). Such a phenomenon can be detected when exposing the cells at increasing hours of illumination and produces a reversible performance increase. Starting from the results obtained through the electro-optical characterization of the cells, we applied a one-diode circuital-model. Our results show a good agreement between the experimental and the simulated data, with a mean square error in the order of 10^{-12} and a maximum error in current lower than 0.6%. Finally such results allowed us to infer some precise trends followed by the cells main electrical parameters and of their equivalent one-diode electrical model due to light soaking effect.

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1. Introduction

Dye Sensitized Solar Cells (DSSCs) exploiting a dye molecule to convert the visible light into electrical energy represent a novel very promising type of low-cost photovoltaic (PV) cells [1, 2]. The structure of a typical DSSC consists of a visible-light-transparent anode covered with a thin layer of a transparent conducting oxide, a porous semiconductor sensitized with a dye, an electrolytic solution and a cathode made of a conductive glass covered with a thin layer of