



# **Zinc oxide nano-structures for photovoltaic applications: Nanowire Based Third Generation Quantum dots sensitized Solar cells**

*Basma El Zein, Elhadj Dogheche*

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To date, the development of nanotechnology has launched new ways to design efficient solar cells. Strategies have been employed to develop nano structures architecture of semiconductors, metals and polymers for solar cells. Motivated by the objective of developing an eco-green and high efficient solar cell; Nanowire based quantum dots sensitized solar cells is presented in the book. The design of the solar cell, the nano structures and the material selections have been also illustrated. Zinc Oxide (ZnO) Nanowires (NWs) were selected as n-type semiconductors to trap the light and capture the photo-generated charges to transport them quickly to the electrodes. Furthermore, Lead Sulfide (PbS) quantum dots (QDs) decorating the synthesized NWs, will absorb more light due to the tunability of the QDs size and increase the electron-hole pairs generation to achieve higher efficiency. The different ZnO NWs growth techniques by vapor deposition specifically by pulsed laser deposition are presented in this book in addition to the in-situ and ex-situ growth techniques of the PbS QDs. A demo of the Solar cell prototype, and recommendations on improving its efficiency is also revealed.

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