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## **SOLAR CELLS BASED ON SEMICONDUCTOR QUANTUM DOTS**

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Semiconducting nanocrystals known as quantum dots (QDs) are being considered as sensitizers in next-generation photovoltaic devices. In fact, semiconductor quantum-dot-sensitized solar cells (QDSSCs) have been evolving rapidly over the last two years, resulting in a significant improvement of light to electric power conversion efficiencies. The use of QDs as an absorber in the cell is motivated by the option of designing third-generation systems based on their tunable size-dependent properties, including multiple carrier generation, hot electron utilization, and tandem cell configurations. During this talk the state of art of solar cells based on quantum dots will be presented, and results of the morphological, structural and optical properties and photoelectrochemical cell performances of electrochemically grown ZnO nanorod arrays decorated with CdS and PbS QDs will be presented.

### **REFERENCES**

Lucia Campo, Carlos J. Pereyra, Lucia Amy, Fernando Elhordoy, Ricardo E. Marotti, Francisco Martín, José Ramón Ramos-Barrado and Enrique A. Dalchiele, "Electrochemically grown ZnO nanorod arrays decorated with CdS quantum dots by using a spin-coating assisted successive-ionic-layer-adsorption and reaction method for solar cell applications", *ECS Journal of Solid State Science and Technology*, 2, Q151-Q158, 2013.

C. J. Pereyra, R. E. Marotti, G. Guerguerian, F. Elhordoy, L. Campo, L. I. Amy, D. L. Gau, F. Martín, D. Leinen, J. R. Ramos-Barrado and E. A. Dalchiele, "Optical Properties of Sensitized Zinc Oxide Nanorods Electrochemically Prepared", *Energy Environ. Focus*, 2, 257-269, 2013.

Gariné Guerguerian, Fernando Elhordoy, Carlos J. Pereyra, Ricardo E. Marotti, Francisco Martín, Dietmar Leinen, José R. Ramos-Barrado and Enrique A. Dalchiele, "ZnO nanorods/CdS nanocrystals core/shell - type heterostructures for solar cell applications", *Nanotechnology*, 22, 505401-505409, 2011.

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