

## عنوان مقاله:

CdS quantum dot sensitized solar cells prepared using Al<sup>3+</sup> doping into TiO<sub>2</sub> photoanodes

## محل انتشار:

شانزدهمین کنگره ملی مهندسی شیمی ایران (سال: 1397)

تعداد صفحات اصل مقاله: 5

## نویسندگان:

Amin Alizadeh - Department of Chemistry, Amirkabir University of Technology (Tehran Polytechnic), P.O. Box:  
.158175-4413, Tehran, Iran

Zahra Mirzaeifard - Department of Chemistry, Amirkabir University of Technology (Tehran Polytechnic), P.O. Box:  
.158175-4413, Tehran, Iran

Vahid Hoseinpour - Department of Chemistry, Amirkabir University of Technology (Tehran Polytechnic), P.O. Box:  
.158175-4413, Tehran, Iran

Zahra Shariatinia - Department of Chemistry, Amirkabir University of Technology (Tehran Polytechnic), P.O. Box:  
.158175-4413, Tehran, Iran

## خلاصه مقاله:

Some quantum dot-sensitized solar cells (QDSSCs) were fabricated by doping Al<sup>3+</sup> ions into the TiO<sub>2</sub> in order to improve their efficiency. Results indicated that the photovoltaic parameters of the optimized cell were boosted compared with those of the reference cell which was free of Al<sup>3+</sup> QDs indicating improvements in efficiency, current density and open-circuit voltage, respectively. It was found that the  $\eta$  value was increased by doping 0.1–0.3% of Al<sup>3+</sup> into TiO<sub>2</sub> paste but adding more amounts (0.4 and 0.5%) decreased the cell efficiency. The highest efficiency was 2.08% by Al<sup>3+</sup> doping into the TiO<sub>2</sub> photoanode which was 45% higher than that of the reference cell ( $\eta=1.43\%$  for the cell made only using TiO<sub>2</sub>/CdS/ZnS photoanode). The short circuit current was increased from 6.58 mA.cm<sup>-2</sup> in Al<sup>3+</sup> free cell to 11.49 mA.cm<sup>-2</sup> in the 0.3% Al<sup>3+</sup>-doped cell. The open circuit voltage was enhanced from 0.529 V in Al-free cell to 0.579 V in the 0.3% Al<sup>3+</sup>-doped cell. Thus, addition of 0.3%wt Al<sup>3+</sup> as a dopant was appropriate to attain suitable photocurrent efficiency for the QDSSCs because it could be used in a minimum amount to improve the .electron transport, drop the recombination rate and increase the cell efficiency

## کلمات کلیدی:

Quantum dot sensitized solar cells; Al<sup>3+</sup> doping; Photocurrent; Photovoltaic performance; Photoluminescence spectra

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/859668>



