

Supplementary Information

AuNRs attached TiO₂ NPs modified by cobalt-imidazolate frameworks as exceptional materials to improve the energy conversion efficiency in dye-sensitized solar cells

Nafiseh Bagheri,¹ Javad Hassanzadeh,¹ Zainab B Al Ruqeishi,¹ Ninie Suhana Abdul Manan,^{2,3}

Haider A.J. Al Lawati,¹ Osama K. Abou-Zied,^{1,*}

¹*Department of Chemistry, College of Science, Sultan Qaboos University, Box 36, Al-Khod 123,
Sultanate of Oman*

²*Department of Chemistry, Faculty of Science, Universiti Malaya, 50603 Kuala Lumpur,
Malaysia*

³*University of Malaya Centre for Ionic Liquids (UMCiL), Universiti Malaya, 50603 Kuala
Lumpur, Malaysia*

* Corresponding author. E-mail: abouzied@squ.edu.om

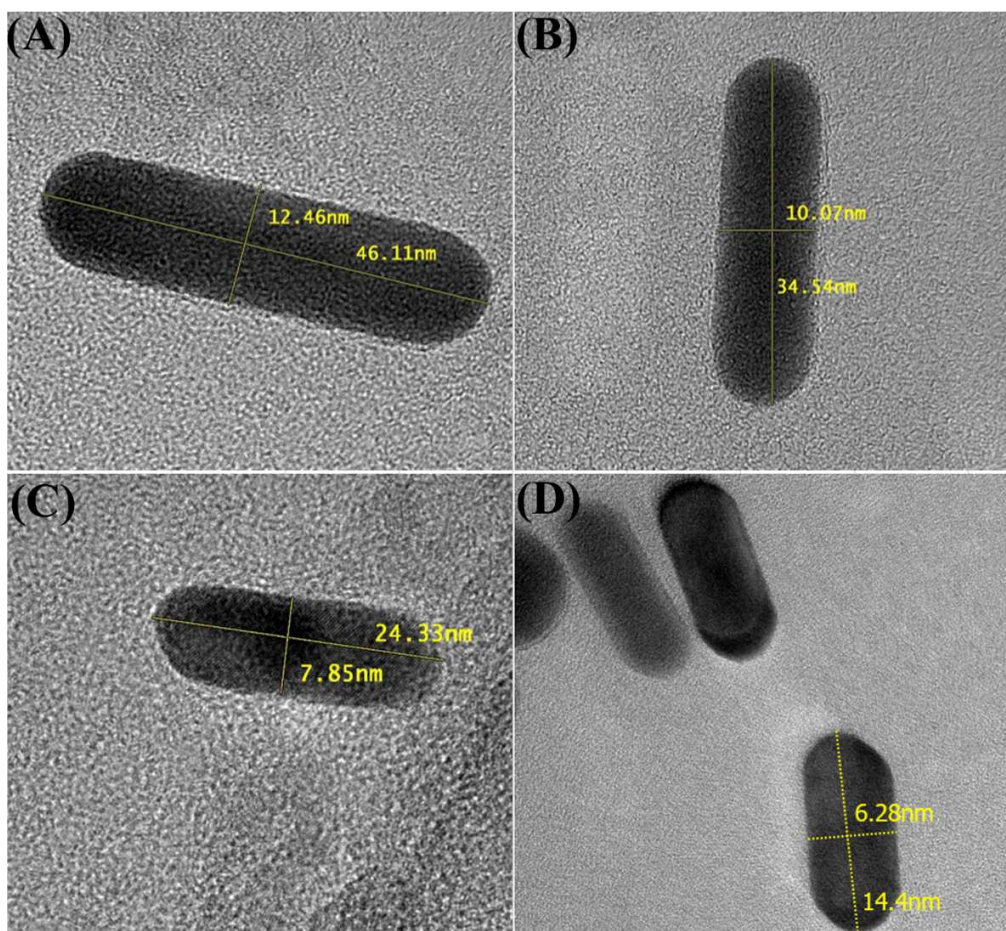


Fig. S1. TEM images of the synthesized AuNRs with different aspect ratios: A) 3.7, B) 3.4, C) 3.1, and D) 2.3.

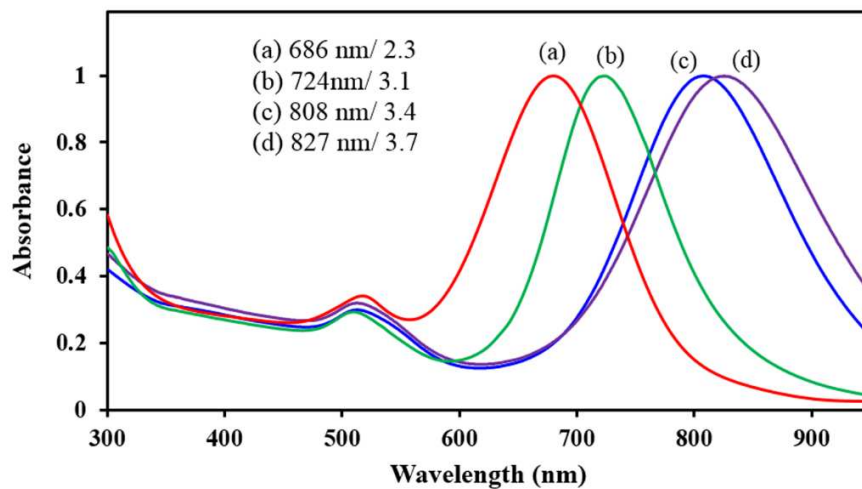


Fig. S2. Absorption spectra of the synthesized AuNRs with different aspect ratios.

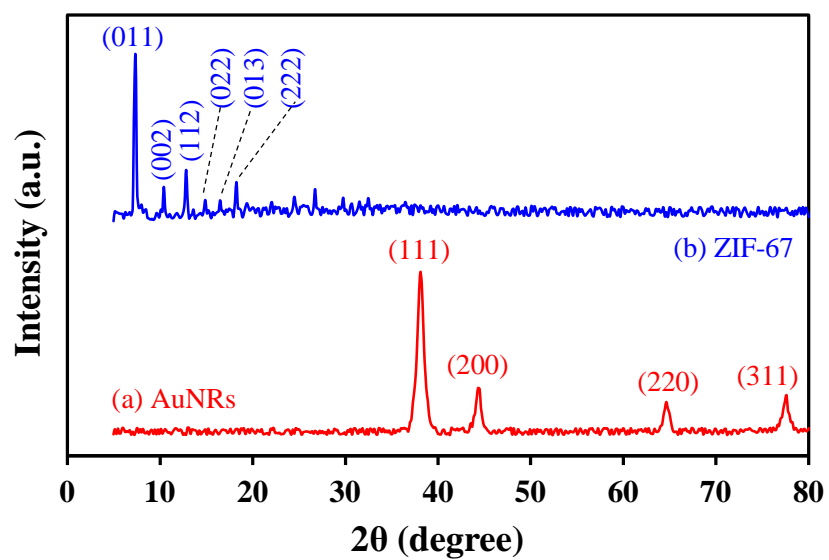


Fig. S3. XRD patterns of (a) AuNRs with aspect ratio of 3.4, (b) ZIF-67.

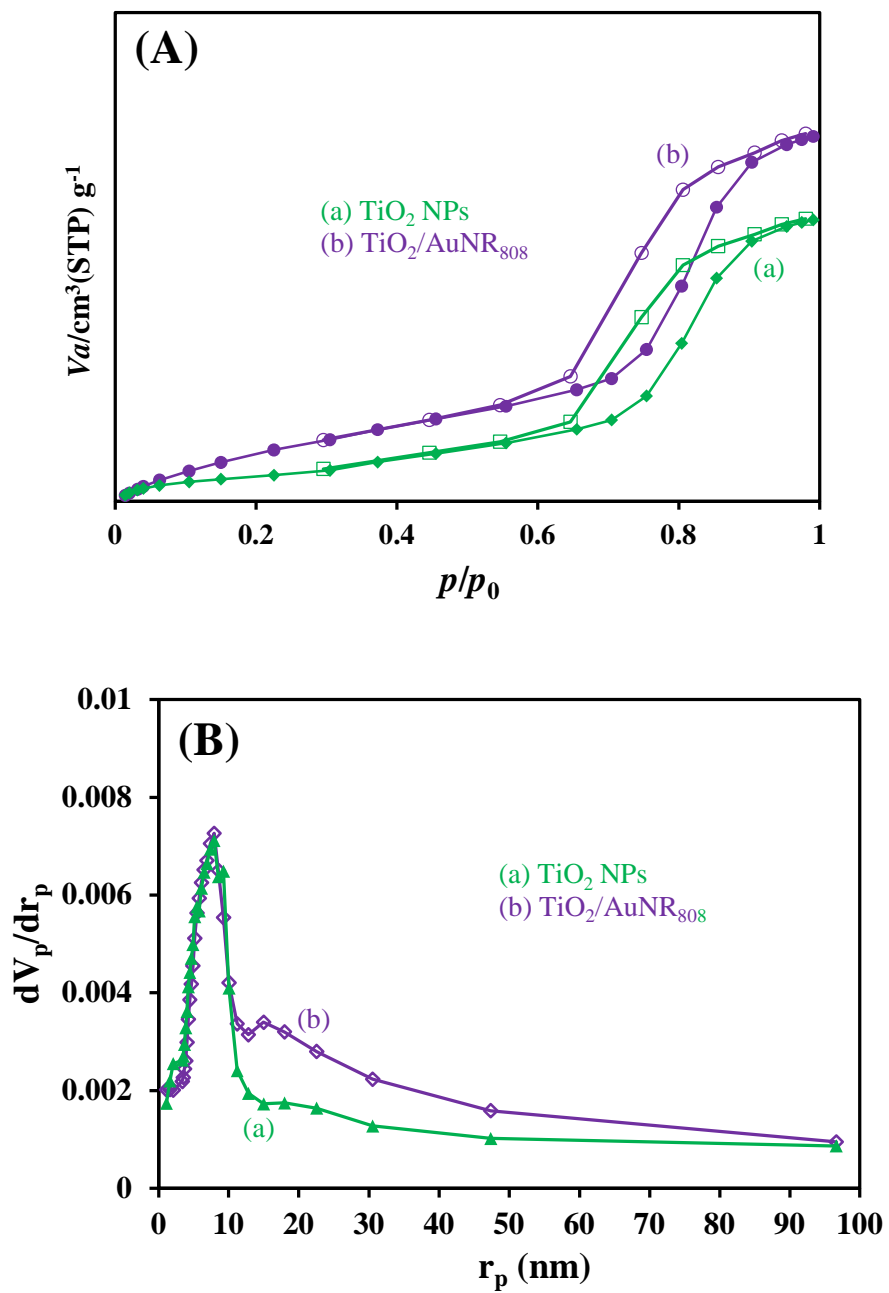


Fig. S4. A) N₂ adsorption-desorption isotherms and B) pore-size distribution for TiO₂ NPs (a) and TiO₂/AuNR₈₀₈

(b).

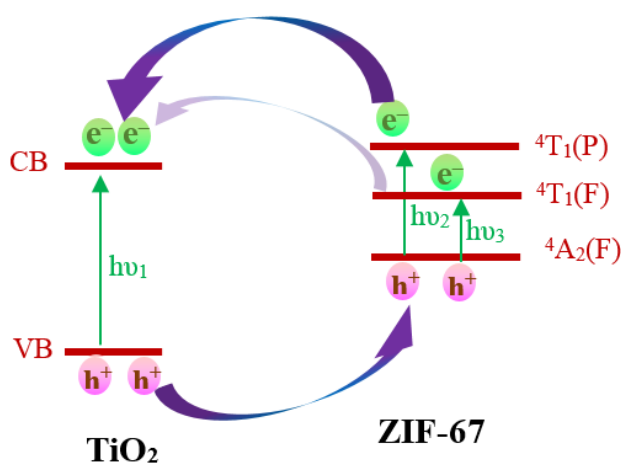


Fig. S5. The schematic representation of energy diagram of ZIF-67 (T_d) and electron transferring to conduction band of TiO_2 .

Table S1. Photovoltaic parameters of the fabricated DSSCs with photoanodes modified by $TiO_2/AuNR_{808}/ZIF$ nanocomposite with different percentage of ZIF-67, sensitized with N719 dye under simulated AM 1.5G solar irradiation of 100 mW cm^{-2}

Percentage of ZIF-67	V_{oc} (V)	J_{sc} (mA cm^{-2})	P_{max} (mW)	FF	$\eta\%$
4%	0.75	10.168	0.871	0.457	3.484
6%	0.76	14.792	1.482	0.527	5.928
8%	0.8	18.804	2.09385	0.557	8.3754
10%	0.81	16.232	1.9173	0.583	7.6692
12%	0.81	12.06	1.49105	0.611	5.9642