Exploring zinc oxide morphologies for aqueous solar cells by a photoelectrochemical, computational, and multivariate approach

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SUPPORTING INFORMATION

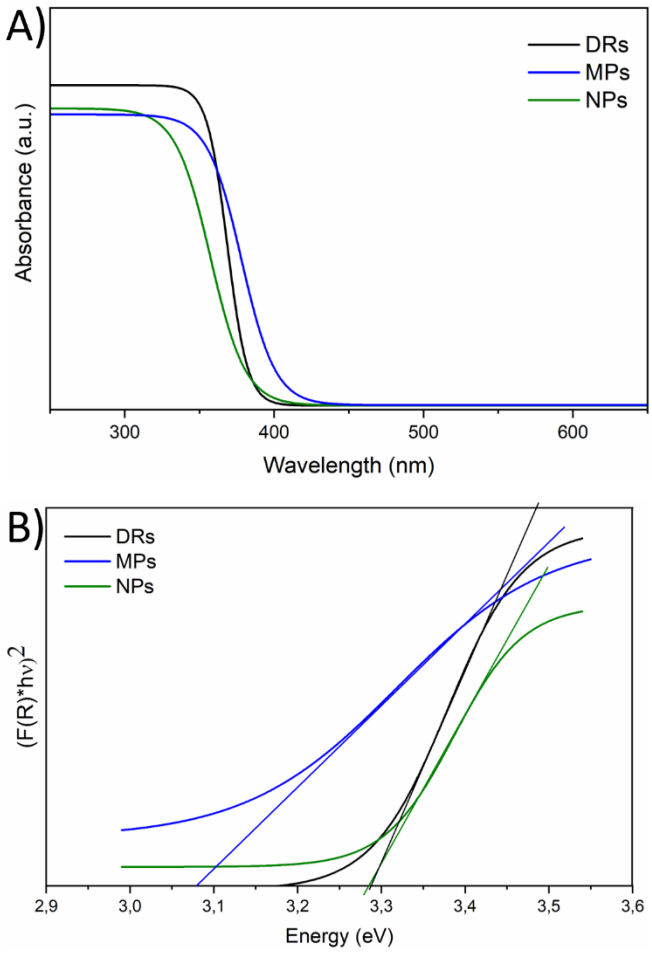

Figure S1. (A) UV-vis curves and (B) band-gap values for the three ZnO morphologies investigated in this work. Samples have been measured as powders dispersed in water and in absorbance mode. As expected, all the ZnO particles absorb light in the UV range from 200 to 400 nm (panel A). Their optical band gap (E_g) was determined adopting the Tauc's method (panel B) calculated from the absorption spectra. As also previously reported [1,2], the E_g of the ZnO samples is in the range of 3.1 - 3.3 eV, confirming that all ZnO structures have a broad band gap and a semiconductor behaviour, allowing their photoexcitation by light with energies in the sole UV range.

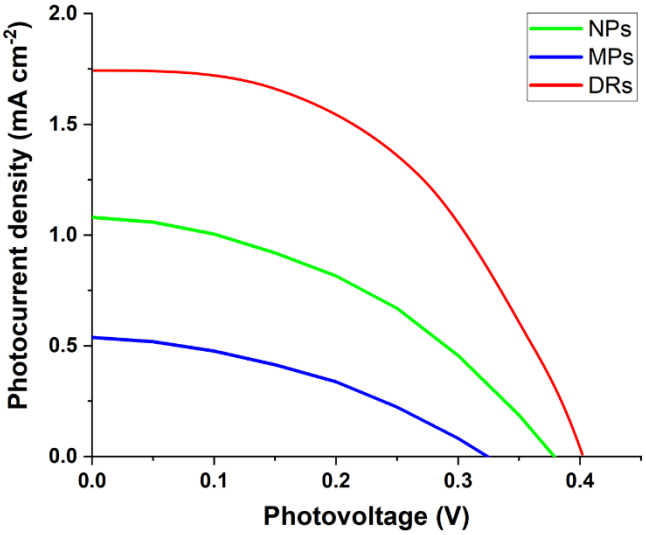

Figure S2. J-V curve measured under 1 sun irradiation (AM1.5G) for aqueous DSSC prepared with different ZnO morphologies, with reference to data shown in Table S1.

References

[1] Hernández, S., Cauda, V., Chiodoni, A., Dallorto, S., Sacco, A., Hidalgo, D., Celasco, E., Pirri, C.F. Optimization of 1D ZnO@TiO_2 core-shell nanostructures for enhanced photoelectrochemical water splitting under solar light illumination. (2014) ACS Applied Materials and Interfaces, 6 (15), pp. 12153-12167.

[2] Hernández, S., Cauda, V., Hidalgo, D., Farías Rivera, V., Manfredi, D., Chiodoni, A., Pirri, F.C. Fast and low-cost synthesis of 1D ZnO-TiO_2/inf core-shell nanoarrays: Characterization and enhanced photo-electrochemical performance for water splitting. (2014) Journal of Alloys and Compounds, 615 (S1), pp. S530-S537.