

Nanocomposites based on SBS triblock copolymer and selectively placed PS-grafted CdSe nanoparticles

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CdSe nanoparticles synthesized by aqueous method were functionalized with polystyrene (PS) brushes (CdSe-PS) by *grafting through* method [1, 2].

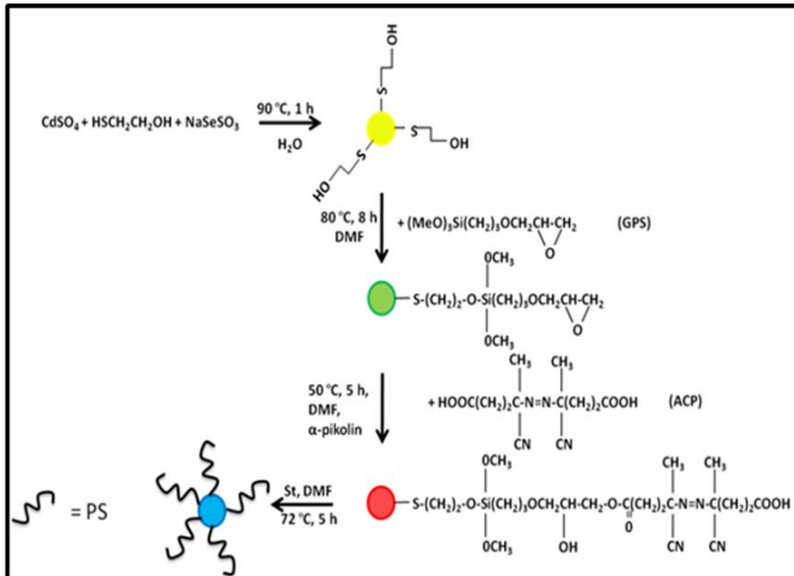


Figure 1. Reaction scheme for the modification of CdSe nanoparticles with PS brushes

Then they were used to prepare nanocomposites by adding different amounts (3, 5 and 10 wt%) to a poly (styrene-*b*-butadiene-*b*-styrene) (SBS) triblock copolymer [3, 4]. Atomic force microscopy (AFM) and electrostatic force microscopy (EFM) [5] were used for morphological and electrical characterization of SBS/CdSe-PS nanocomposites. AFM images showed a good dispersion of the nanoparticles in the block copolymer, with the placement of the nanoparticles in the PS domains due to the improved affinity obtained by their functionalization with PS brushes.

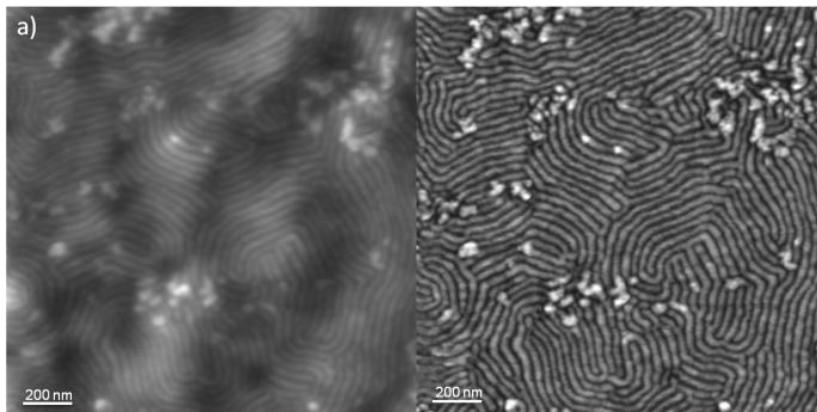


Figure 2. AFM image (left/right: height/phase) for 10 wt % SBS/PS-CdSe composite

EFM showed that nanoparticles maintained their conductive properties even after being modified and

embedded in the block copolymer.

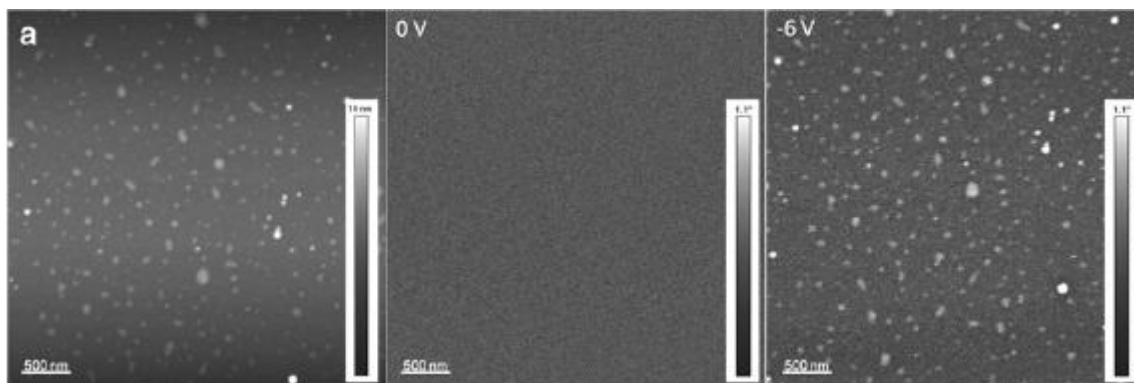


Figure 3. EFM image (left/center/right height/EFM phase (0 V)/EFM phase (-6 V)) for CdSe-PS

References

- [1] H. Etxeberria, G. Kortaberria, I. Zalakain, A. Larrañaga, I. Mondragon. *Journal of Materials Science*, **47** (2012) 7167.
- [2] H. Etxeberria, I. Zalakain, A. Tercjak, I. Mondragon, G. Kortaberria. *Journal of Nanoscience and Nanotechnology* **13** (2013) 643.
- [3] H. Etxeberria, I. Zalakain, A. Eceiza, G. Kortaberria. *Journal of Colloid and Polymer Science* **291** (2013) 1881.
- [4] H. Etxeberria, R. Fernandez, I. Zalakain, I. Mondragon, G. Kortaberria. *Journal of Colloid and Polymer Science* **291** (2013) 633.
- [5] H. Etxeberria, I. Zalakain, A. Tercjak, A. Eceiza, G. Kortaberria. *Journal of Colloid and Polymer Science* (2013) DOI 10.1007/s00396-013-3061-3.

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