



# Facile enhancement of bulk heterojunction solar cells performance by utilizing PbSe nanorods decorated with graphene

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Auteur	El-Menyawy, Emad M [1], Cattin, Linda [2], Bernède, Christian [3], Louarn, Guy [4], Arzel, Ludovic [5]
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Mots-clés	BHJ solar cells [6], graphene [7], Optical absorption [8], PbSe nanorods [9], Surface morphology [10]
Résumé en anglais	<p>An efficient approach for improving the photoelectrical conversion efficiency (PCE) of the bulk heterojunction (BHJ) solar cells, based on poly(3-hexylthiophene) (P3HT) and [6,6]-phenyl-C61 butyric acidmethyl ester (PC61BM), by incorporating PbSe nanorods decorated with graphene (G) into their active layer has been reported for the first time. Pristine PbSe and PbSe:G composites (with different amount of graphene) are synthesized via hydrothermal process and the formation mechanism is explained. The systematic investigation indicates that the crystallite size of PbSe:G increases with increasing grapheme content. The PCE of the classical BHJ solar cells based on P3HT:PC61BM is improved from 2.32 up to 2.57% by the incorporation of pristine PbSe. It is also enhanced by the incorporation of PbSe:G up to certain composition of graphene in which a maximum PCE value of 5.16% is achieved. The external quantum efficiency of the BHJ solar cells is also investigated. The photovoltaic parameters are discussed based on the morphology variation detected by scanning electron microscope and atomic force microscope of the active layers together with their UV-VIS absorption measurements.</p>
URL de la notice	<a href="http://okina.univ-angers.fr/publications/ua19991">http://okina.univ-angers.fr/publications/ua19991</a> [11]
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## Liens

- [1] <http://okina.univ-angers.fr/publications?f%5Bauthor%5D=39150>
- [2] <http://okina.univ-angers.fr/publications?f%5Bauthor%5D=3568>
- [3] <http://okina.univ-angers.fr/c.bernedede/publications>
- [4] <http://okina.univ-angers.fr/publications?f%5Bauthor%5D=21361>
- [5] <http://okina.univ-angers.fr/publications?f%5Bauthor%5D=38307>
- [6] <http://okina.univ-angers.fr/publications?f%5Bkeyword%5D=29217>
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- [11] <http://okina.univ-angers.fr/publications/ua19991>
- [12] <http://dx.doi.org/10.1016/j.jcis.2019.06.010>
- [13] <https://www.sciencedirect.com/science/article/pii/S0021979719306836?via%3Dihub>

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