Close

Web of Science
Page 1 (Records 1 -- 1)

Print

[1]

Record 1 of 1

Title: Interplay of Optical, Morphological, and Electronic Effects of ZnO Optical Spacers in Highly Efficient Polymer Solar Cells

Author(s): Ben Dkhil, S (Ben Dkhil, Sadok); Duche, D (Duche, David); Gaceur, M (Gaceur, Meriem); Thakur, AK (Thakur, Anil K.); Aboura, FB (Aboura, Fatima Bencheikh); Escoubas, L (Escoubas, Ludovic); Simon, JJ (Simon, Jean-Jacques); Guerrero, A (Guerrero, Antonio); Bisquert, J (Bisquert, Juan); Garcia-Belmonte, G (Garcia-Belmonte, Germa); Bao, QY (Bao, Qinye); Fahlman, M (Fahlman, Mats); Videlot-Ackermann, C (Videlot-Ackermann, Christine); Margeat, O (Margeat, Olivier); Ackermann, J (Ackermann, Joerg)

Source: ADVANCED ENERGY MATERIALS **Volume:** 4 **Issue:** 18 **Article Number:** 1400805 **DOI:** 10.1002/aenm.201400805 **Published:** DEC 29 2014

Times Cited in Web of Science Core Collection: 7

Total Times Cited: 7

Usage Count (Last 180 days): 4

Usage Count (Since 2013): 60

Cited Reference Count: 43

Abstract: Optical spacers based on metal oxide layers have been intensively studied in poly(3-hexylthiophene) (P3HT) based polymer solar cells for optimizing light distribution inside the device, but to date, the potential of such a metal oxide spacer to improve the electronic performance of the polymer solar cells simultaneously has not yet be investigated. Here, a detailed study of performance improvement in high efficient polymer solar cells by insertion of solution-processed ZnO optical spacer using ethanolamine surface modification is reported. Insertion of the modified ZnO optical spacer strongly improves the performance of polymer solar cells even in the absence of an increase in light absorption. The electric improvements of the device are related to improved electron extraction, reduced contact barrier, and reduced recombination at the cathode. Importantly, it is shown for the first time that the morphology of optical spacer layer is a crucial parameter to obtain highly efficient solar cells in normal device structures. By optimizing optical spacer effects, contact resistance, and morphology of ZnO optical spacers, poly[[4,8-bis[(2-ethylhexyl) oxy] benzo[1,2-b: 4,5-b'] dithiophene-2,6diyl] [3-fluoro-2-[(2-ethylhexyl) carbonyl] thieno[3,4-b] thiophenediyl]] (PTB7):[6,6]-phenyl-C71-butyric acid (PC70 BM) bulk heterojunction solar cells with conversion efficiency of 7.6% are obtained in normal device structures with all-solution-processed interlayers.

Accession Number: WOS:000346983100010

Language: English

Document Type: Article

KeyWords Plus: CARRIER TRANSPORT; BUFFER LAYER; FILL-FACTORS; PERFORMANCE; BULK; FULLERENE; NANOPARTICLES; INTERFACE; SOLVENT; VOLTAGE

Addresses: [Ben Dkhil, Sadok; Gaceur, Meriem; Thakur, Anil K.; Videlot-Ackermann, Christine; Margeat, Olivier; Ackermann, Joerg] Aix Marseille Univ, CNRS, CINaM UMR 7325, F-13288 Marseille, France.
[Duche, David; Aboura, Fatima Bencheikh; Escoubas, Ludovic; Simon, Jean-Jacques] Univ Toulon & Var, CNRS, Aix Marseille Univ, UMR 7334 IM2NP, F-13397 Marseille, France.
[Guerrero, Antonio; Bisquert, Juan; Garcia-Belmonte, Germa] Univ Jaume 1, Dept Fis, Photovolta & Optoelect Devices Grp, Castellon de La Plana 12071, Spain.
[Bisquert, Juan] King Abdulaziz Univ, Fac Sci, Dept Chem, Jeddah, Saudi Arabia.
[Bao, Qinye; Fahlman, Mats] Linkoping Univ, Dept Phys Chem & Biol, S-58183 Linkoping, Sweden.

Reprint Address: Simon, JJ (reprint author), Univ Toulon & Var, CNRS, Aix Marseille Univ, UMR 7334 IM2NP, F-13397 Marseille, France.

E-mail Addresses: jean-jacques.simon@univ-amu.fr; ackermann@cinam.univ-mrs.fr

Author Identifiers:

Author	ResearcherID Number	ORCID Number
Fahlman, Mats	A-1524-2009	0000-0001-9879-3915
Margeat, Olivier	O-6782-2016	
Duche, David	R-3205-2016	
Garcia-Belmonte, Germa	C-3719-2017	0000-0002-0172-6175
Faculty of, Sciences, KAU	E-7305-2017	
Bisquert, Juan	O-2543-2013	0000-0003-4987-4887
Guerrero, Antonio		0000-0001-8602-1248
SIMON, Jean-Jacques	A-8400-2015	0000-0002-3508-9565
Duche, David	C-4751-2013	
Bencheikh, Fatima	B-9083-2015	0000-0001-5827-3579
Bao, Qinye	A-5110-2013	
Escoubas, Ludovic	E-9703-2012	

Publisher: WILEY-V C H VERLAG GMBH

Publisher Address: POSTFACH 101161, 69451 WEINHEIM, GERMANY

Web of Science Categories: Chemistry, Physical; Energy & Fuels; Materials Science, Multidisciplinary; Physics, Applied; Physics, Condensed Matter

Research Areas: Chemistry; Energy & Fuels; Materials Science; Physics

IDS Number: AX5QX

ISSN: 1614-6832

eISSN: 1614-6840

29-char Source Abbrev.: ADV ENERGY MATER

ISO Source Abbrev.: Adv. Energy Mater.

Source Item Page Count: 12

Funding:

Funding Agency	Grant Number
French Fond Unique Intermisteriel (FUI) under "SFUMATO"	F1110019V/201308815
European Commission	287594
Generalitat Valenciana (Institute of Nanotechnologies for Clean Energies)	ISIC/2012/008

The authors acknowledge financial support by the French Fond Unique Intermisteriel (FUI) under the project "SFUMATO" (Grant number: F1110019V/201308815) as well as by the European Commission under the Project "SUNFLOWER" (FP7), grant agreement number 287594. Generalitat Valenciana (ISIC/2012/008 Institute of Nanotechnologies for Clean Energies) is also acknowledged for providing financial support.

Open Access: No

Output Date: 2017-07-18

Close

Web of Science
Page 1 (Records 1 -- 1)

Print

[1]