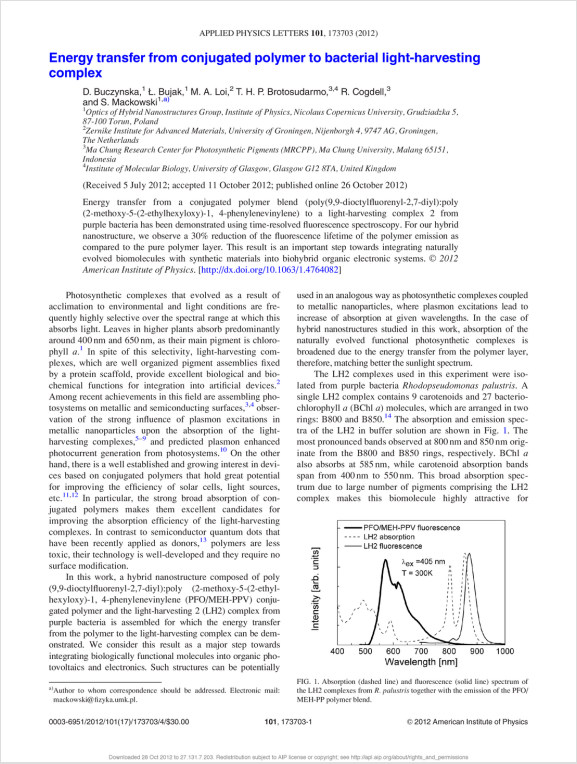
Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	Tatas Hardo Panintingjati Brotosu...
Assignment title:	Evaluasi Jurnal
Submission title:	Energy Transfer from Conjungated..
File name:	6._Energy_Transfer-APL.pdf
File size:	515.18K
Page count:	4
Word count:	2,830
Character count:	14,974
Submission date:	19-Jan-2018 09:31AM (UTC+0700)
Submission ID:	904201062



APPLIED PHYSICS LETTERS **101**, 173703 (2012)

Energy transfer from conjugated polymer to bacterial light-harvesting complex

D. Buczynska,[1] Ł. Bujak,[1] M. A. Loi,[2] T. H. P. Brotosudarmo,[3,4] R. Cogdell,[3] and S. Mackowski[1,a)]
[1]*Optics of Hybrid Nanostructures Group, Institute of Physics, Nicolaus Copernicus University, Grudziadzka 5, 87-100 Torun, Poland*
[2]*Zernike Institute for Advanced Materials, University of Groningen, Nijenborgh 4, 9747 AG, Groningen, The Netherlands*
[3]*Ma Chung Research Center for Photosynthetic Pigments (MRCPP), Ma Chung University, Malang 65151, Indonesia*
[4]*Institute of Molecular Biology, University of Glasgow, Glasgow G12 8TA, United Kingdom*

(Received 5 July 2012; accepted 11 October 2012; published online 26 October 2012)

Energy transfer from a conjugated polymer blend (poly(9,9-dioctylfluorenyl-2,7-diyl):poly (2-methoxy-5-(2-ethylhexyloxy)-1, 4-phenylenevinylene) to a light-harvesting complex 2 from purple bacteria has been demonstrated using time-resolved fluorescence spectroscopy. For our hybrid nanostructure, we observe a 30% reduction of the fluorescence lifetime of the polymer emission as compared to the pure polymer layer. This result is an important step towards integrating naturally evolved biomolecules with synthetic materials into biohybrid organic electronic systems. © *2012 American Institute of Physics*. [http://dx.doi.org/10.1063/1.4764082]

Photosynthetic complexes that evolved as a result of acclimation to environmental and light conditions are frequently highly selective over the spectral range at which this absorbs light. Leaves in higher plants absorb predominantly around 400 nm and 650 nm, as their main pigment is chlorophyll *a*.[1] In spite of this selectivity, light-harvesting complexes, which are well organized pigment assemblies fixed by a protein scaffold, provide excellent biological and biochemical functions for integration into artificial devices.[2] Among recent achievements in this field are assembling photosystems on metallic and semiconducting surfaces,[3,4] observation of the strong influence of plasmon excitations in metallic nanoparticles upon the absorption of the light-harvesting complexes,[5–9] and predicted plasmon enhanced photocurrent generation from photosystems.[10] On the other hand, there is a well established and growing interest in devices based on conjugated polymers that hold great potential for improving the efficiency of solar cells, light sources, etc.[11,12] In particular, the strong broad absorption of conjugated polymers makes them excellent candidates for improving the absorption efficiency of the light-harvesting complexes. In contrast to semiconductor quantum dots that have been recently applied as donors,[13] polymers are less toxic, their technology is well-developed and they require no surface modification.

In this work, a hybrid nanostructure composed of poly (9,9-dioctylfluorenyl-2,7-diyl):poly (2-methoxy-5-(2-ethylhexyloxy)-1, 4-phenylenevinylene (PFO/MEH-PPV) conjugated polymer and the light-harvesting 2 (LH2) complex from purple bacteria is assembled for which the energy transfer from the polymer to the light-harvesting complex can be demonstrated. We consider this result as a major step towards integrating biologically functional molecules into organic photovoltaics and electronics. Such structures can be potentially used in an analogous way as photosynthetic complexes coupled to metallic nanoparticles, where plasmon excitations lead to increase of absorption at given wavelengths. In the case of hybrid nanostructures studied in this work, absorption of the naturally evolved functional photosynthetic complexes is broadened due to the energy transfer from the polymer layer, therefore, matching better the sunlight spectrum.

The LH2 complexes used in this experiment were isolated from purple bacteria *Rhodopseudomonas palustris*. A single LH2 complex contains 9 carotenoids and 27 bacteriochlorophyll *a* (BChl *a*) molecules, which are arranged in two rings: B800 and B850.[14] The absorption and emission spectra of the LH2 in buffer solution are shown in Fig. 1. The most pronounced bands observed at 800 nm and 850 nm originate from the B800 and B850 rings, respectively. BChl *a* also absorbs at 585 nm, while carotenoid absorption bands span from 400 nm to 550 nm. This broad absorption spectrum due to large number of pigments comprising the LH2 complex makes this biomolecule highly attractive for

FIG. 1. Absorption (dashed line) and fluorescence (solid line) spectrum of the LH2 complexes from *R. palustris* together with the emission of the PFO/ MEH-PP polymer blend.

a)Author to whom correspondence should be addressed. Electronic mail: mackowski@fizyka.umk.pl.

Energy Transfer from Conjungated polymer to Bacterial Light-Harvesting Complex, Applied Physics Letters Vol. 101, 173703, Hal. 173703-1 s/d 173703-4

by Tatas Hardo Panintingjati Brotosudarmo

Submission date: 19-Jan-2018 09:31AM (UTC+0700)
Submission ID: 904201062
File name: 6._Energy_Transfer-APL.pdf (515.18K)
Word count: 2830
Character count: 14974

Energy Transfer from Conjungated polymer to Bacterial Light-Harvesting Complex, Applied Physics Letters Vol. 101, 173703, Hal. 173703-1 s/d 173703-4

ORIGINALITY REPORT

28%	22%	26%	9%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	smart.hit.edu.cn Internet Source	2%
2	Sebastian Mackowski. "Hybrid nanostructures for efficient light harvesting", Journal of Physics Condensed Matter, 05/19/2010 Publication	2%
3	Olejni, M.; Twardowska, M.; Zaleszczyk, W. and Mackowski, S.. "Bioconjugation of Silver Nanowires with Photosynthetic Light-Harvesting Complexes", Acta Physica Polonica, A., 2012. Publication	2%
4	digital.csic.es Internet Source	1%
5	file.scirp.org Internet Source	1%
6	repo.pw.edu.pl Internet Source	1%