

CPP 30: P2: Organic Electronics and Photovoltaics

Time: Tuesday 14:00–16:00

Location: Poster B

CPP 30.1 Tue 14:00 Poster B
NMR of ^{129}Xe and ^{13}C or ^{31}P - Construction of a UHV Compatible Double Resonance Probe — ●LARS KRAFT, ALEXANDER POTZUWEIT, ANUSCHKA SCHAFFNER, and HEINZ JÄNSCH — FB Physik, Philipps Universität Marburg, 35032 Marburg

The goal of the current project is the investigation of internal atomic layers by NMR techniques. As conventional NMR is by far not sensitive enough to address few layers of semiconductor material grown on a substrate, the sensitivity must be enhanced by 3 to 5 orders of magnitude. This can be achieved by dynamic nuclear polarization (DNP), i.e. the transfer of polarization from a hyperpolarized ^{129}Xe film to possible probe nuclei like ^{31}P or ^{13}C .

Here we describe the technical development of an NMR probe simultaneously resonant to two different kinds of nuclei in an UHV environment which is necessary for DNP. The idea is to extend the existing probe by coupling a second circuit that provides the additional resonance frequency leaving the present UHV setup unchanged. The main task is to match the signal and power transmission between the probe and the spectrometer.

The DNP process is most efficient at close contact. Therefore a ^{13}C graphene substrate may be a first material investigated. For an internal ^{31}P layer inside a heterostructure the substrate must contain the layer within a few atomic distances from the surface.

Supported by DFG und GRK 1782.

CPP 30.2 Tue 14:00 Poster B
Surface properties and crystallization behavior of thin films of a high mobility electron-transporting semicrystalline polymer studied with MUSIC-mode AFM — ●MARIO ZERSON¹, MARTIN NEUMANN¹, DIETER NEHER², and ROBERT MAGERLE¹ — ¹Fakultät für Naturwissenschaften, Technische Universität Chemnitz, Chemnitz, Germany — ²Institute of Physics and Astronomy, University of Potsdam, Potsdam-Golm, Germany

We study the crystallization behavior, the surface structure, and the nanomechanical properties of the thiophene-based semiconducting copolymer P(NDI2OD-T2) using multi-set point intermittent contact (MUSIC) mode atomic force microscopy (AFM). The influence of the annealing temperature and the film thickness on the resulting morphology is studied. The crystalline lamellae form larger domains which differ in the effective tip-sample interaction, the energy dissipated between the tip and the sample, and the tip indentation into the surface. The two types of domains are attributed to the two known crystalline forms of P(NDI2OD-T2). In contrast to other semicrystalline polymers, we detect no amorphous top layer; the edges of the crystalline lamellae are exposed to the surface. The tip indentation into the surface is attributed to the thickness of the layer of side chains, which covers the edges of the crystalline lamellae. Films annealed at 320°C form terraces with a step height of 2.2 nm. The terraces are formed by the edges of closely spaced crystalline lamellae. The step height between adjacent layers correspond to the height of monomolecular layers of edge-on oriented polymer chains.

CPP 30.3 Tue 14:00 Poster B
Interplay of Environmental and Molecular Factors in Backbone Order of a Semiconducting Polymer: A DFT Study of Polyfluorenes — ●ELIZABETH LUPTON¹, FENG LIU², and BERNHARD DICK¹ — ¹Institute for Physical and Theoretical Chemistry, University of Regensburg, Universitaetsstrasse 31, 93053 Regensburg, Germany — ²Department of Materials Science and Engineering, University of Utah, Salt Lake City, UT 84112, USA

The environmental and molecular parameters which determine the nature of chromophores in polymeric systems are identified through systematic studies of molecules with well defined structures. Polyfluorenes exhibit both disordered and ordered phases which depend on the degree of planarity of the conjugated polymer backbone and can be distinguished spectroscopically. We examine the intrinsic and extrinsic factors that determine the ordering of the backbone using DFT and TDDFT calculations. We determine that a stable ordered phase with a specific torsional angle between repeat units exists which planarizes on excitation, and that specific deviations from the ordering, such as rotations which cause deviations from backbone linearity, do not affect the molecules' ability to planarize. The results demonstrate

the complicated interplay between external confinement, intermolecular properties and photoexcitation in determining the structure and photophysics of organic semiconducting polymers.

CPP 30.4 Tue 14:00 Poster B
Morphological and dynamic ordering of the semiconducting polymer PBTTT — MATTHIAS J. N. JUNK¹, DMYTRO DUDENKO², NICHOLE CATES MILLER³, SEAN SWEETNAM³, MICHAEL D. MCGEHEE³, BRADLEY F. CHMELKA¹, MICHAEL R. HANSEN^{2,4}, KURT KREMER², ●ANTON MELNYK², and DENIS ANDRIENKO² — ¹University of California, Santa Barbara, California 93106, U.S.A. — ²Max-Planck-Institute für Polymerforschung, Ackermannweg 10, 55128 Mainz, Germany — ³Stanford University, Stanford, California, 94305, U.S.A. — ⁴Aarhus University, Gustav Wieds Vej 14, DK-8000 Aarhus C, Denmark

Molecular dynamics of the conjugated polymer poly(2,5-bis(3-hexadecylthiophen-2-yl)thieno[3,2-b]thiophene) (PBTTT-C16) are quantitatively measured using solid-state NMR spectroscopy and compared to atomistic molecular dynamics simulations. The comparison reveals crystalline domains that have well-ordered interdigitated alkyl sidechains with restricted rotational mobilities up to the terminal methyl group, accompanied by well-ordered polymer backbones. Amorphous domains, which comprise 50% of as-synthesized PBTTT-C16, consist of disordered side chains with a significantly higher degree of rotational mobility. From planarity in amorphous domains. In conjunction with a decreased $\pi - \pi$ stacking order, the partially interrupted backbone conjugation may be predominantly responsible for significantly decreased charge-carrier mobility in the amorphous regions.

CPP 30.5 Tue 14:00 Poster B
The effect of crystallization on the charge mobility through P3HT-PC70BM films — ●KAIWAN JAHANSHAH¹, VLADIMIR DYAKONOV^{1,2}, and CARSTEN DEIBEL³ — ¹Experimental Physics VI, Julius-Maximilian University of Würzburg, 97074 Würzburg, Germany — ²Bavarian Center for Applied Energy Research (ZAE Bayern), 97074 Würzburg, Germany — ³Institut für Physik Optik und Photonik kondensierter Materie, Technische Universität Chemnitz, 09107 Chemnitz, Germany

Poly(3-hexylthiophene) (P3HT) and fullerene (PC70BM) mixtures are one of the most important semiconducting polymer-fullerene blend materials in organic photovoltaic. Because of the intricacy of the crystal formation in these type of polymer-fullerene blends, the relationship between their crystalline structure and mobility of the charges through their bulk structure is not comprehensively discussed. In this study we have used a well controlled process of solvent annealing technique in order to grow well-ordered P3HT-PC70BM spherulites as an active layer in our solar cells which enabled us to employ time of flight (TOF) and OT-RACE techniques to measure the mobility of the charges through the bulk of the crystalline film and perpendicular to the plane of the spherulitic crystals and compare them to the mobility of the charges through an amorphous active layer.

CPP 30.6 Tue 14:00 Poster B
Hot charges speed up non geminate recombination but have no effect on device performance — ●JONA KURPIERS, STEVE ALBRECHT, and DIETER NEHER — Institute of Physics and Astronomy, Soft Matter Physics, University of Potsdam, D-14476 Potsdam

In this work, we use time delayed collection field (TDCF) experiments with exceptionally high time resolution to investigate the charge carrier dynamics in the PCDTBT:PC70BM system. Although this system has a high fill factor of around 70% and an internal quantum efficiency approaching unity under steady state illumination conditions, TDCF experiments reveals non-geminate recombination on the 10 ns time-scale, even for charge carrier densities comparable to one sun illumination. This loss becomes significantly accelerated at higher pulse fluence. To identify the reason for this rapid loss, the recombination dynamics was further investigated with constant white light background illumination, which introduces a tunable steady state carrier density, and on thicker devices. We observe that the short term decay dynamics is not affected by the background carrier density. It is concluded that the main reason for the nongeminate loss observed at the 10 ns time

scale is recombination of hot charges close to the contacts. As recombination occurs mainly between hot electrons and holes, this loss channel seems to be insignificant under steady state illumination. Our result imply that transient experiments, considering the dynamics of *freshly-generated* charges should be considered with great care when aiming at the understanding of device function under steady-state illumination conditions.

CPP 30.7 Tue 14:00 Poster B

Calculation of excited states in donor-acceptor heterojunctions via GW-BSE/MM — •JENS WEHNER, DENIS ANDRIENKO, and BJÖRN BAUMEIER — Max Planck Institute for Polymer Research, Ackermannweg 10, 55128 Mainz, Germany

Modelling charge separation in organic solar cells must take into account the quantum nature of the photo-induced excitations and the influence of large-scale morphological order to fully understand and predict the properties of the dominant processes. This requires multi-scale methods to capture the quantum mechanics of the problem while keeping the computational cost tractable.

Here, we use a QM/MM approach based on GW-BSE and polarizable force-fields to study the conversion of Frenkel excitons into charge transfer states at prototypical small-molecule C60 donor-acceptor interface. The iterative self-consistent solution of the coupled GW-BSE/MM problem allows us to analyze the influence of the molecular alignment and the long-range order at the interface on the driving force behind the charge separation process.

CPP 30.8 Tue 14:00 Poster B

Charge Transfer Between Single-Wall Carbon Nanotubes, Fullerenes and Polymers — •MICHAEL AUTH¹, ANDREAS SPERLICH¹, FLORIAN SPÄTH³, TOBIAS HERTEL³, and VLADIMIR DYAKONOV^{1,2} — ¹Experimental Physics VI, Julius Maximilian University of Würzburg — ²ZAE Bayern, 97074 Würzburg — ³Physical and Theoretical Chemistry II, Julius Maximilian University of Würzburg

Single-Wall Carbon Nanotubes (SWNT) are of interest to improve the spectral response of organic photovoltaic cells (OPV) due to their near-infrared absorption bands. Additionally, their unique electrical properties, stemming from their one-dimensionality, recommend them to improve charge transport properties of electrons and holes in existing OPV systems. However, it is to date unclear, whether SWNTs act as electron donors or acceptors in conjunction with common OPV materials. Before we can optimize those systems, we need to understand how the SWNTs contribute to charge transfer processes. In this study semiconducting (6,5) SWNTs are combined with widely known OPV materials, such as the fullerene acceptor PC₆₀BM and the polymer P3HT. Using Electron Paramagnetic Resonance (EPR) we can distinguish charge carriers residing on different conjugated organic molecules and SWNTs. We found specific EPR signatures for charges located on either SWNT, P3HT or PC₆₀BM. Our measurements hint at the potential ambipolarity of SWNTs, leading to either hole transfer from PC₆₀BM or electron transfer from P3HT.

CPP 30.9 Tue 14:00 Poster B

Determination of the CT energy of organic small molecule solar cells by different methods — •THERESA LINDERL, MARK GRUBER, STEFAN GROB, ULRICH HÖRMANN, ALEXANDER HOFMANN, and WOLFGANG BRÜTTING — Universität Augsburg, 86135 Augsburg, Germany

The open-circuit voltage V_{OC} of organic solar cells is limited by the formation of a charge transfer (CT) state at the donor-acceptor interface. We determine the energy of the CT state for small molecule organic solar cells by different methods and compare the obtained values. Electroluminescence (EL) spectroscopy on heterojunction devices together with the spectra of single layer devices of the individual materials are used to determine the CT feature in the spectrum. For voltages just above V_{OC} an additional feature can be detected in the low energy range that cannot be attributed to any of the individual materials. Together with sensitive IPCE (Incident Photon to Current Efficiency) measurements the CT energy can be determined and compared to the values derived from temperature dependent measurements of the current-voltage (j - V) characteristics. Both, dark and illuminated j - V curves can be used to determine the CT gap energy. We find that the energy loss from the CT energy to $q \cdot V_{OC}$ at room temperature is 0.55 eV for all investigated material systems.

CPP 30.10 Tue 14:00 Poster B

Comparison of DFT functionals and insights into photo-

induced charge separation in Ruthenium terpyridine complexes — •JULIA PREISS^{1,2}, BENJAMIN DIETZEK^{1,3}, TODD MARTÍNEZ^{2,4}, and MARTIN PRESSELT^{1,4} — ¹Institute for Physical Chemistry and Abbe Center of Photonics, Friedrich-Schiller-University Jena — ²SLAC National Accelerator Laboratory, Menlo Park, California 94309, USA — ³Leibniz Institute of Photonic Technology (IPHT) Jena — ⁴Department of Chemistry and PULSE Institute, Stanford University

Ruthenium polypyridine-type complexes are an extensively used sensitizer to convert solar energy into chemical and/or electrical energy, and can be tailored via their metal-to-ligand-charge transfer (MLCT) properties. We explore the nature of the ¹MLCT states of remotely substituted Ru(II) model complexes by both experimental and theoretical techniques. Two model complexes with electron-withdrawing (-NO₂) and electron-releasing (-NH₂) groups were synthesized, including a phenylene spacer to serve as spectroscopic handle and to confirm the contribution of the remote substituent to the ¹MLCT transition. The [Ru(tpy)₂]²⁺-based complexes (tpy is tpy 2,2':6',2'-terpyridine) are further de-symmetrized by tert-butyl groups to yield uni-directional ¹MLCTs with large transition dipole moments, beneficial for related directional charge transfer processes. Detailed comparison of experimental spectra with theoretical calculations based on density functional theory, revealed different properties of the optically active bright ¹MLCT state already at the Franck-Condon point.

CPP 30.11 Tue 14:00 Poster B

Performance P3HT:PCBM solar cells modified with iron oxide nanoparticles — •DANIEL MOSEGUÍ GONZÁLEZ¹, VOLKER KÖRSTGENS¹, YUAN YAO¹, LIN SONG¹, GONZALO SANTORO², STEPHAN ROTH², and PETER MÜLLER-BUSCHBAUM¹ — ¹TU München, Physik-Department, LS Funktionelle Materialien, James-Frank-Str. 1, 85748, Garching — ²Deutsches Elektronen-Synchrotron DESY, Notkestr. 85, 22607, Hamburg

Among the different systems studied in organic solar cells, the combination of P3HT:PCBM has received the highest attention due to easy commercial availability. However, regarding further boost in efficiencies, doping with heavy metals has shown interesting behavior. The presence of heavy metals increases the L-S coupling in the system, increasing the rate of intersystem crossing, and thereby lowering the averaged recombination rate. The aim of the present investigation is to characterize through which channels the presence of iron oxide nanoparticles affects the performance of P3HT:PCBM based solar cells. The morphology evolution is tracked with advanced scattering techniques. Spectral behavior and electrical response of devices are also investigated, providing altogether a detailed picture of doped systems.

CPP 30.12 Tue 14:00 Poster B

Characterization and comparison of the optical properties of high-efficiency polymers PBDTT-FTTE and PBT7 — •FRANZISKA LÖHRER, SHUAI GUO, and PETER MÜLLER-BUSCHBAUM — TU München, Physik-Department, LS Funktionelle Materialien, James-Frank-Str. 1, 85748 Garching

Organic photovoltaics are gaining impact as a feasible alternative to conventional silicon solar cells. Using polymers as active material has several potential advantages, for instance reduced production costs and an increased device flexibility. A prominent and well-understood example is P3HT, which has been diligently investigated in the last years. However, efficiencies stay far below those of competing inorganic solar cells. Recent research efforts focus on identifying new high-efficiency polymers in order to enhance the cell performance. This has led to the development of high-efficiency materials such as PTB7 or the new PBDTT-FTTE with reported efficiencies approaching 10 %. However, these materials are still very cost-intensive and their functionality is not yet fully understood. Previous morphological investigations linked to the device performance give first insights into the working mechanisms of PTB7 based solar cells. In the present study we investigate the optical and morphological properties of PBDTT-FTTE in comparison to those of PTB7 and the well-known P3HT. Applied characterization techniques include UV/Vis- and IV-measurements, optical microscopy, AFM, as well as XRR and GISAXS/GIWAXS. Exploratory solar cells link the conversion efficiency to parameters such as the composition and morphology of the active layer.

CPP 30.13 Tue 14:00 Poster B

Resonant GISAXS of conducting polymers — •MIHAEL CORIC¹, NITIN SAXENA², JAN WERNECKE³, STEFANIE LANGNER³, PE-

TER MÜLLER-BUSCHBAUM², MICHAEL KRUMREY³, and EVA M. HERZIG¹ — ¹Technische Universität München, Munich School of Engineering, 85748 Garching, Germany — ²Technische Universität München, LS Funktionelle Materialien, 85748 Garching, Germany — ³Helmholtz-Zentrum Berlin BESSY, Physikalisch-Technische Bundesanstalt (PTB), Albert-Einstein-Straße 15, 12489 Berlin

In the last few years the use of X-ray for investigation of morphological structure of polymeric thin films in photovoltaic has increased. It is a suitable method to investigate morphological changes in the polymer film. So far mostly hard x-ray around 10 keV are used to probe the samples. The disadvantage of using hard x-rays when looking at polymers is that the scattering contrast is low and therefore they are difficult to distinguish from each other.

Another approach that is pursued in this work is choosing x-ray energies that are near absorption edges of certain elements. Using x-rays at absorption edges enables a much higher contrast between the different materials, increasing the distinguishability of the different components within the active film of the organic solar cell. In combination with grazing incident small angle scattering (GISAXS), the use of resonant x-rays at the absorption edge, offers a sophisticated way to investigate morphological changes of the polymer blend, making it a promising method for future use.

CPP 30.14 Tue 14:00 Poster B

Characterization of PTB7-Th:PC71BM bulk heterojunction solar cells — ●EDOARDO BARABINO, WEIJIA WANG, and PETER MÜLLER-BUSCHBAUM — TU München, Physik-Department, LS Funktionelle Materialien, James-Franck-Str. 1, 85748 Garching

Organic photovoltaic devices are approaching the efficiency of traditional silicon based solar cells and are promising low-cost and ease production via roll-to-roll printing. In the bulk heterojunction morphology a low-band gap conjugated polymer (electron donor) and a fullerene derivative (acceptor) are blended together. The low-band gap polymer brings to the production of more excitons due to absorbing more photons (higher short circuit current) and to higher open circuit voltage. Recently a novel PTB7 derivative, denoted as PTB7-Th, has shown efficiency values close to 10%. We investigate organic solar cells made by this polymer PTB7-Th and PC71BM current-voltage characterization. In addition external quantum efficiency (EQE), UV-Vis absorption and photoluminescence spectroscopy are applied to further characterize these solar cells. Additionally the active layer surface structure is inspected via atomic force microscope (AFM).

CPP 30.15 Tue 14:00 Poster B

Evolution of the Morphology during Functional Stacks Build-up of P3HT:PCBM Inverted Solar Cells — ●WEIJIA WANG¹, STEPHAN PRÖLLER^{1,2}, MARTIN A. NIEDERMEIER¹, VOLKER KÖRSTGENS¹, MARTINE PHILIPP¹, BO SU¹, SHUN YU^{3,4}, STEPHAN V. ROTH³, and PETER MÜLLER-BUSCHBAUM¹ — ¹TU München, Physik-Department, LS Funktionelle Materialien, James-Franck-Str. 1, 85748 Garching — ²Technische Universität München, MSE, Herzog Group, Lichtenbergstr. 4, 85748 Garching — ³DESY, Notkestraße 85, 22603 Hamburg — ⁴KTH, School of Chemical Science and Engineering, Teknikringen 56-58, 100 44 Stockholm, Sweden

Poly(3-hexylthiophene-2,5-diyl) (P3HT):phenyl-C61-butyric acid methyl ester (PCBM) bulk heterojunction (BHJ) is a well established model system for organic solar cells. Introducing an inverted geometry in a BHJ solar cell has been applied in several groups to achieve stable and more efficient solar cells. However, the basic understanding of the evolution of the morphologies during the complex functional stack assembling is still unknown. Therefore, the gradual evolution of the P3HT:PCBM morphology is investigated by AFM and GISAXS measurements. The inverted P3HT:PCBM BHJ solar cell show an increased power conversion efficiency as compared to the standard geometry, which is explained by the different morphology of the active layer.

CPP 30.16 Tue 14:00 Poster B

Morphology of PCPDTBT:PC71BM Thin Films for Organic Photovoltaics — ●CHRISTOPH J. SCHAFER¹, JOHANNES SCHLIPP¹, BO SU¹, EFI DWI INDARI¹, SIGRID BERNSTORFF², and PETER MÜLLER-BUSCHBAUM¹ — ¹TU München, Physik-Department, LS Funktionelle Materialien, James-Franck-Str. 1, 85748 Garching — ²Eletra Sincrotrone Trieste, 34012 Basovizza, Italy

As a convenient pathway to ever more efficient polymer-based solar cells, the use of solvent additives has proven to boost the power con-

version efficiencies of several low-bandgap polymer:fullerene systems. The strong improvement of solar cell characteristics is thereby mostly related to a drastic change in nano morphology of the active blend layers induced by the use of solvent additives. It is, however, not yet fully understood how the use of certain solvent additives influences the morphology and the stability of the specific blend layers.

In this work, we investigate the morphological changes of PCPDTBT:PC71BM films induced by the use of 1,8-octanedithiol by means of grazing incidence small and wide angle x-ray scattering and X-ray reflectivity and find that ODT enhances micro phase separation and consequently polymer crystallization. The findings are complemented by UV/Vis and photoluminescence spectroscopy. Furthermore, we show that the optical characteristics of blend films with ODT are highly unstable on a timescale of days.

CPP 30.17 Tue 14:00 Poster B

Morphology tuning and interface engineering of new donor model layers — FELIX HERRMANN¹, RAINER BECKERT², BENJAMIN DIETZEK^{1,3}, and ●MARTIN PRESSELT¹ — ¹Institute of Physical Chemistry, Friedrich Schiller University Jena, D-07743 Jena, Germany — ²Institute of Organic Chemistry and Macromolecular Chemistry, Friedrich Schiller University Jena, D-07743 Jena, Germany — ³Leibniz Institute of Photonic Technology (IPHT), Albert-Einstein-Str. 9, 07745 Jena, Germany

In the last years the efficiency of organic solar cells has been greatly enhanced towards actually 12%. These enhancements were mainly driven by using and synthesizing new active materials. The basic processes of exciton dissociation and recombination at the donor-acceptor interface are extensively debated because in bulk heterojunction devices capturing the nature of the interface and its morphology is challenging. Using the Langmuir-Blodgett technique allows for the production of donor-acceptor bilayer structures with defined interfaces and tunable ordering as model systems. We focus on tuning of the morphology of individual layers composed of merocyanines of varied chromophore size and their optical properties. Thus, one essential precondition for the investigation of defined donor-acceptor interfaces is accomplished.

CPP 30.18 Tue 14:00 Poster B

degradation in printed polymer:fullerene thin films for organic photovoltaics — ●JAN RICHARD STOCKHAUSEN, PETER MÜLLER-BUSCHBAUM, and CHRISTOPH SCHAFER — TU München, Physik-Department, LS Funktionelle Materialien, James-Franck-Str. 1, 85748 Garching, Germany

In comparison to conventional silicon solar cells, organic photovoltaics (OPVs) offer several advantages, like ease of production and a high versatility. Nevertheless, their lifetime needs to be prolonged, so that a profitable large-scale production becomes feasible. Therefore, a detailed understanding of the degradation mechanisms is necessary. In the present investigation, we address UV induced aging of PCPDTBT:PC71BM and P3HT:PCBM active layers, printed in a positive shim mask slot dye coater. Changes in the films due to accelerated aging are investigated by means of atomic force microscopy (AFM), X-ray reflectivity (XRR) and UV/Visible light spectroscopy (UV/Vis).

CPP 30.19 Tue 14:00 Poster B

Exploring the impact of inter-segmental mixing and photodegradation on the photovoltaic performance of donor-acceptor-type polymer solar cells using a novel particle-based multiscale solar-cell algorithm — ANTON PERSHIN, SERGI DONETS, and ●STEPHAN BAEURLE — Institut für Physikalische und Theoretische Chemie, Universität Regensburg, 93040 Regensburg

Polymer solar cells possess a promising perspective for generating renewable energy at affordable costs, provided their performance and durability can be improved considerably. To this end, several experimental techniques have been devised recently, establishing a direct link between the local morphology, local opto-electronic properties and device performance. However, their reliability is still unclear to this day. Here, we demonstrate by using a novel particle-based multiscale solar-cell approach [1] and comparing its results with the ones of a field-based solar-cell algorithm that inter-mixing of the electron-donor(D)- and -acceptor(A)-type of segments in a lamellar-like PFB-F8BT blend causes that the major part of the charge generation and charge transport takes place in the bulk of the nanophases of the nanostructured polymer solar cells in agreement with recent experimental measurements and not, as commonly believed, at the visible domain boundaries of the DA interface. Moreover, we demonstrate that photo-oxidation of the fluorene moiety of the F8BT phase leads to keto-induced electron

trapping, resulting in a deteriorated electronic transport efficiency in photodegraded PFB-F8BT-blend devices. Literature: [1] A. Pershin,

S. Donets, S.A. Baeurle, Polymer 55, 3736 (2014).