COST Action MP1307

Stable Next Generation Photovoltaics: Unraveling Degradation Mechanisms of Organic Solar Cells by Complementary Characterization Techniques.

2nd MC Meeting and 1st WG Meeting

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WP4: Non-destructive Characterization

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Sample & Characterization issues

- Samples are divided as

  Industrial (I), Modules (M), Cells (C) and Films (F)

- Contacts need to be of robust nature (!!!) – for repeated contacting and long-term measurements

- Depending on sample type, YOUR characterization technique might be either NON-DESTRUCTIVE or DESTRUCTIVE
- Why? Because, if we need to open a sealed device, the characterization following is DESTRUCTIVE

How to choose participation?

Point system(???):

- Your method is useful for the specific goal of an experiment
- You can provide more than one method at the same time
- Logistics remains doable
- Experiment remains conductible

- In general: the lowest complexity of experiments will be preferred that can provide a critical amount of information
- Sorry, no extrapoints… ;-)

Method Classification:

Non-Destructive?

Solar Modules and Solar Cells

Non-destructive

- Raman
- UV-Vis
- PL/EL
- Ellipsometry
- IS
- IV
- EQE
- CELIV
- LBIC
- PLI/ELI
- DLIT/ILIT
- OM
- Modelling & Simulation

Destructive

- AFM
- STM
- SEM
- XPS
- STXM
- NEXAFS
- SAXS
- ERDA
- He ion microscopy
- SIMS
- RBS
- GISAXS
- GIWAXS

Not applicable
RBS, TEM, ET, FTIR, DSC, TGA, DSC

Layer Stack Subsystem

Non-destructive

- Raman
- PL
- Ellipsometry
- PLI
- OM
- AFM
- STM
- SEM
- TEM
- FTIR/IR
- DSC
- ILIT
- XPS (surface)
- Modelling & Simulation
- SHIM
- STXM
- NEXAFS
- GISAXS
- GIWAXS
- SAXS
- ET

Destructive

- XPS (depth)
- SIMS
- ERDA

Not applicable

EL, IS, IV, CELIV, EQE, ELI, DLIT, LBIC, RBS, TGA

Films

Non-destructive

- Raman
- PL
- Ellipsometry
- PLI
- OM
- AFM
- STM
- SEM
- TEM
- FTIR/IR
- DSC
- ILIT
- XPS (surface)
- Modelling & Simulation
- SHIM
- STXM
- NEXAFS
- GISAXS
- GIWAXS
- SAXS
- ET

Destructive

- XPS (depth)
- SIMS
- ERDA
- TGA

Not applicable

EL, IS, IV, CELIV, EQE, ELI, DLIT/ILIT, LBIC, RBS

- SHIM: scanning helium ion microscopy
- IS: impedance spectroscopy
- STXM: scanning transmission x-ray microscopy
- NEXAFS: near-edge x-ray absorption fine structure
- SIMS: secondary ion mass spectrometry
- OM: optical microscopy
- RBS: Rutherford backscattering spectrometry
- ERDA: elastic recoil detection analysis
- ET: electron tomography
- DSC: differential scanning calorimetry
- TGA: thermal gravimetric analysis
- CELIV: charge extraction by linearly increasing voltage
- GIS(W)AXS: grazing-incidence small(wide)-angle x-ray scattering

n-d. Characterization:
Result of Survey

Next steps

- Please check your assignment
- We will update the general n-d characterization list
- We might add a column for modules
- We might consider to build up a small database for example characterizations