

## International Symposium TOWARDS ORGANIC PHOTOVOLTAICS in the field of Organic and Dye Sensitized Solar Cells February 6<sup>th</sup>-8<sup>th</sup>, 2008, Linz

### Zentrum für Sonnenenergie- und Wasserstoff-Forschung (ZSW)

The ZSW was established in 1988 by the state of Baden-Württemberg, together with universities, research institutions, and commercial companies, as a non-profit foundation with currently approximately 120 employees. It is dedicated to the research and development (R&D) of photovoltaic materials, hydrogen technology, and electrochemical energy conversion and storage with emphasis on industrial technology transfer of R&D results to market-relevant products.

The ZSW is strongly committed to research on the Cu(In,Ga)Se<sub>2</sub> (CIGS) thin-film solar cell technology, PV systems (modules, inverters, storage), as well as special applications (building integration, façades, tracking, lighting). ZSW's expertise in CIGS technology has led to the world's first large-scale production line of CIGS modules through the ZSW's industrial partner Würth Solar.

The ZSW is well equipped with all of the machinery necessary for the small-scale fabrication and analysis of thin-film solar modules. The machinery comprises PVD (thermal evaporation, sputtering), CVD, chemical bath deposition, substrate preparation, patterning, interconnection, and encapsulation. The analytical equipment comprises XRD, XRF, SEM, EDX, SNMS, SIMS, XPS, UV/VIS spectroscopy, Raman spectroscopy, and various devices specifically designed for the investigation of solar cells (solar simulator, quantum efficiency, Hall effect, accelerated ageing test, sheet resistance, reflectivity, mechanical tests, etc.).

The initial work on organic solar cells started in 2004. In this early stage the main effort was to set up the basic technology and get a fundamental understanding of the physics and material properties, focusing on bulk heterojunction systems. Current topics are improving the cell efficiencies, ITO-free solar cells, up-scaling and module development with monolithic electrical interconnection, and technology transfer to flexible substrates. Special emphasis is put on understanding the influences of interface effects and different cathode deposition methods.

#### Recent publications related to organic solar cells:

- Ahlswede et al., *Comparative study of the influence of LiF, NaF, and KF on the performance of polymer bulk heterojunction solar cells*, Appl. Phys. Lett. **90**, 163504 (2007).
- Ahlswede et al., *Influence of cathode sputter deposition on organic solar cells*, Appl. Phys. Lett. **90**, 063513 (2007).
- Hanisch et al., *Contacts for semitransparent organic solar cells*, Eur. Phys. J. Appl. Phys. **37**, 261 (2007).
- Hanisch et al., *All-sputtered contacts for organic solar cells*, Thin Solid Films (2008), in press, <http://dx.doi.org/10.1016/j.tsf.2007.12.036>.

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