



Polymers Laboratory
Professor J. Kallitsis

The research activities related to the green chemistry are mainly focused on the development of new materials for energy applications. One of our main activities is the design and synthesis of new polymeric electrolytes that can be applied in PEM fuel cells operating above 130°C. Thus, not special requirements are needed for the feed hydrogen in respect to its CO content making possible the economically viable operation of these cells. Membrane electrode assemblies (MEAs) and single cells based on these new materials are constructed and tested in order to improve their performance and long term stability.

In respect to our activity for plastic solar cells, we design and synthesize new copolymers containing electron donating and electron accepting sites and their blends. The photovoltaic response of these systems is optimized based on the HOMO-LUMO adjustment and the control of the morphology. Photovoltaic cells with low performance so far have been tested.

RELATED PUBLICATIONS

1. V. Deimede, G. Voyiatzis, J.K. Kallitsis, L. Qingfeng, N.J. Bjerrum, "Miscibility Behavior of Polybenzimidazole/Sulfonated Polysulfone Blends for use in Fuel Cell Applications", *Macromolecules* 33, 7609 (2000).
2. C.L. Chochos, G.K. Govaris, F. Kakali, P. Yiannoulis, J.K. Kallitsis and V.G. Gregoriou, "Synthesis, Optical and Morphological Characterization of Soluble Main Chain 1,3,4-Oxadiazole Copolyarylethers – potential Candidates for Solar Cells Applications as Electron Acceptors" *Polymer* 46, 4654 (2005).