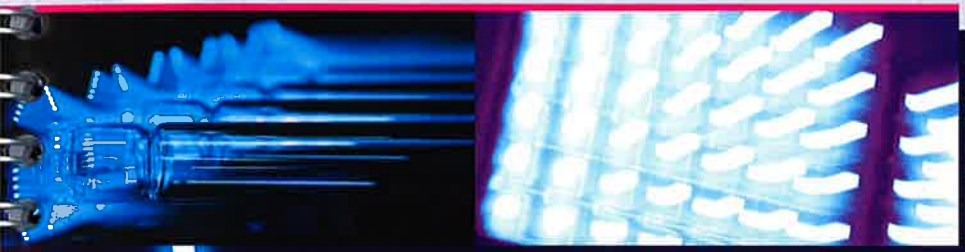
RadTech Europe 13

EUROPE'S EVENT FOR UV/EB CURING

UV/EB – Growing through Innovation



Pictures: Heraeus Noblelight

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abstract book

The official event of
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The association for the promotion of UV & EB curing technology

VINCENTZ

Session 10: Innovations, New Applications

Title:	10.5	**Photocurable P-AMPS-Based Proton Exchange Membranes For Direct Methanol Fuel Cells**
Speaker:		Dr. Samuel Ligon, Vienna University of Technology, Austria
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Co-Author(s):		Michael Kellner, Philip Radovanovic, Jovan Matovic, Robert Liska
Abstract:		Proton exchange membranes (PEM) for low temperature fuel cells must ensure high proton conductivity and effective separation of anode and cathode under operating conditions. DuPont's sulfonic acid fluoropolymer Nafion has seen commercial success, though high cost limits wider acceptance. As lower cost options, polymers based on 2-acrylamido-2-methylpropane sulfonic acid (AMPS) are also investigated. Swelling of polyAMPS (PAMPS) is however a shortcoming, although this may be reduced by improved crosslinking. Both commercial and novel crosslinkers were tested with AMPS by dissolving with photoinitiator in water and photo-curing. To facilitate conductivity measurements, polymers were constrained within a porous membrane. In contrast to commercial crosslinkers, where high percentages are required to improve conductivity, our new acrylamide based crosslinkers showed excellent results at lower concentrations. Thus 5 wt% crosslinker provided membranes with 2.5 times the conductivity of Nafion. The novel polymers were then coated onto asymmetric membranes increasing proton-conductivity and reducing methanol crossover.