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## A Principal Route for Modification of PSU Intended for PEMs by "Click" Chemistry

Nielsen, Mads Møller; Dimitrov, Ivaylo; Takamuku, Shogo; Jannasch, Patric; Jankova Atanasova, Katja ; Hvilsted, Søren

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**Title:**

**A Principal Route for Modification of PSU Intended for PEMs by “Click” Chemistry**

**Authors & affiliations:**

**Mads M. Nielsen<sup>1</sup>, Ivaylo Dimitrov<sup>1</sup>, Shogo Takamuku<sup>2</sup>, Patric Jannasch<sup>2</sup>, Katja Jankova<sup>1</sup>, Søren Hvilsted<sup>1</sup>**

<sup>1</sup>Department of Chemical and Biochemical Engineering, Danish Polymer Centre, Technical University of Denmark, Soltofts Plads 227, DK-2800 Kgs. Lyngby, Denmark

<sup>2</sup>Division of Polymer and Materials Chemistry, Lund University, P. O. Box 124, SE-221 00 Lund, Sweden

mon@kt.dtu.dk; Tel.: +45 4525 6819; Fax: +45 4588 2161

**Abstract:** (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will ‘expand’ over 2 pages as you add text/diagrams into it.)

The main hurdles on the field of Proton Exchange Membranes (PEM) in fuel cells (FC) are to obtain better durability and improved performance at  $>80^{\circ}\text{C}$  at a reduced cost<sup>1</sup>. The proton conductivity of state-of-the-art perfluorosulfonic acid (PFSA) type membranes like Nafion® generally decays at higher temperatures, where the PEMFC system is more beneficial<sup>2</sup>. An alternative backbone is the commercially polysulfone (PSU) Udel® with good chemical, thermal and mechanical as well as film forming properties - the latter is a feature that easily rules otherwise strong candidates out<sup>3</sup>.

To obtain proton conductivity sulfonic acid (SA) groups are linked to the PSU by a Cu(I) catalyzed 1,3-cycloaddition of azides and terminal alkynes. Different monosulfonated compounds are used in order to investigate the influence of the structure between the SA and the backbone. Disulfonated compounds are used in obtaining more concentrated SA domains, and the quantitative azide-alkyne “click” reaction facilitates dendron structures, e.g. with four SA units linked to the same dendritic spacer. The final structure is also tuned through the use of various degrees of substitution of the backbone.

To the best of our knowledge the concept of obtaining proton conductivity of PSU PEMs via sulfonated dendrons prepared by “click” chemistry has not been presented before.

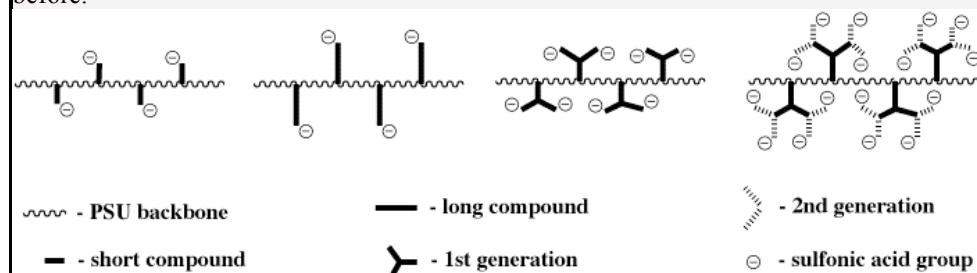


Figure 1. Different sulfonate structures are clicked onto the PSU backbone. Dendrons are made by “click” chemistry to increase the SA domains.

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<sup>3</sup> I. Dimitrov, K. Jankova, S. Hvilsted J. Polym. Sci. Part A: Polym. Chem 46 (2008) 7827-7834; 48 (2010) 2044-2052