

## **GÖCH-OBERÖSTERREICH PROGRAMMVORSCHAU**

**08.03.2016**

**Prof. Christian Slugovc**

Graz University of Technology, Institute  
for Chemistry and Technology of  
Materials

**“Macroporous ROMP derived polymers &  
nucleophile mediated oxa-Michael addition  
polymerization”**

Johannes Kepler Universität Linz  
17.15 Uhr, Hörsaal 13 (TNF-Turm)



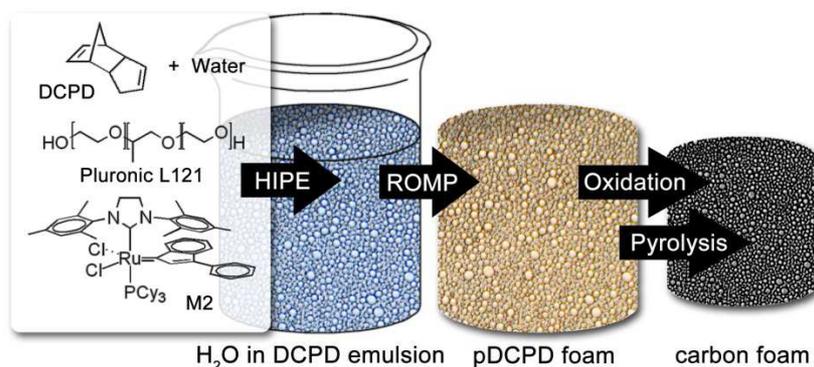
Univ.-Prof.Dr. Günther Knör  
Leiter GÖCH – Oberösterreich

# Macroporous ROMP derived polymers & nucleophile mediated oxa-Michael addition polymerization

C. Slugovc

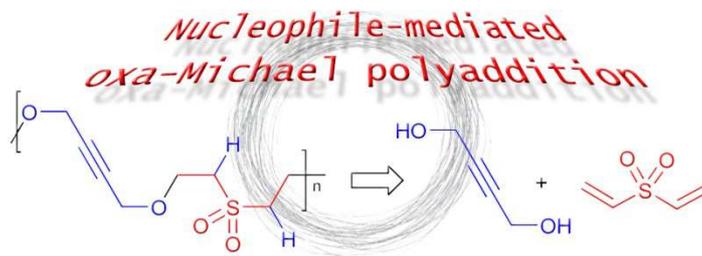
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Macroporous microcellular polymers are a class of polymeric materials with specific morphological features and have a broad application spectrum. Open cellular morphology of macroporous polymers can be achieved, among other methods, by high internal phase emulsion templating. High internal phase emulsions (HIPE) are emulsions where the volume fraction of the internal phase exceeds 74% and can be used to prepare macroporous monoliths if the continuous phase contains monomers. In that manner, porous polymeric monoliths with cellular diameters between several and several hundred  $\mu\text{m}$  have been prepared and used as living culturing scaffold, reagent and catalyst support, chromatography media, filtration media, etc.



Herein the use of dicyclopentadiene (DCPD) as the monomer cured by Ring Opening Metathesis Polymerization (ROMP) under HIPE conditions is presented. DCPD is a cheap by-product of steam cracking and polyDCPD is a tough, rigid, thermosetting polymer exhibiting high impact resistance, high chemical corrosion resistance and high heat deflection temperature. polyDCPD is a highly unsaturated polymer, thus functionalization of the porous material is easily feasible. Several ways to exploit the latter feature will be discussed including the simple oxidation by air which paves the way for converting the polymer foams into macroporous carbon foams.

In a second chapter, the use of the oxa-Michael addition reaction for polymer synthesis is disclosed.



This research aims at the advancement of the Michael addition polymerization methodology. In particular the substitution of thiols for alcohols is intended and first steps towards this goal will be presented. The substitution of thiols for alcohols would be desirable for the fact, that much more alcohols are readily (and commercially) available than thiols. Moreover, inherent drawbacks of thiols, such as their tendency to give oxidative disulfide formation, their (often) bad odor and toxicity as well as their propensity to oxidize to give sulfones and sulfoxides in the final materials could be circumvented. The challenge here is that alcohols are less acidic and less nucleophilic than thiols.