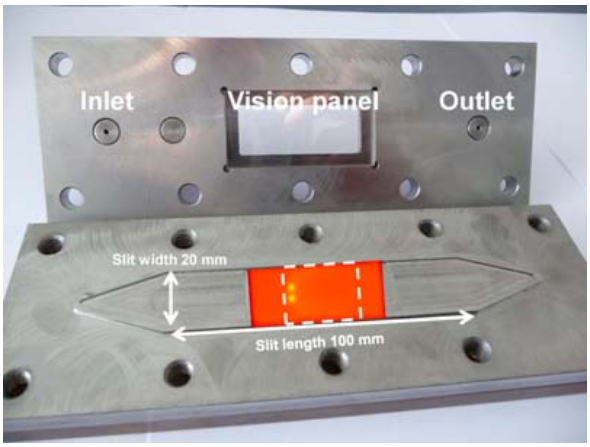
CBI ERLANGEN

Donnerstag 17. Jan. 2013
16:15 Uhr, Hörsaal H3

# Heterogeneously Catalyzed Partial Oxidations in the Explosion Regime using Microreactors

**Prof. Dr.-Ing. Elias Klemm**
University of Stuttgart, Institute of Chemical Technology



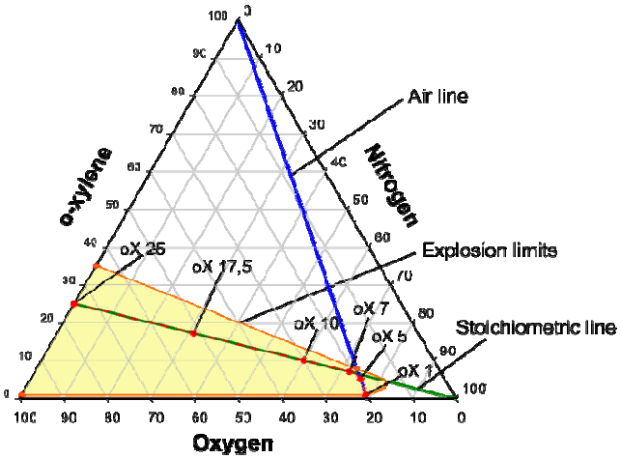




Figure: left: Hotspot formation monitored with IR camera (area coated with catalyst marked by dashed rectangular, coating thickness 500 $\mu$m, Feed Composition oX10). right: Feed compositions investigated

Heterogeneously catalyzed partial oxidations in the gas phase are an important class of reactions that are usually carried out below the lower or above the upper explosion limit in order to avoid thermal and chain explosions. Due to there high surface-to-volume ratio microreactors allow the suppression of both thermal and chain explosions. However, microreactors are not inherently safe, but nevertheless they allow a significant expansion of the safe operation window depending on reaction conditions and the reactor dimensions chosen. In the safety engineering part of the project, performed at the Federal Institute of Materials Research and Testing in Berlin (BAM), these dependencies have been investigated and in the chemical reaction engineering part of the project, performed at University of Stuttgart, opportunities and limitations for the application in chemical industry are exploited. Safe operation inside the explosion regime and a strong process intensification could be demonstrated, but even for catalyst coatings and micro fixed beds hotspots can occur (see figure above) which cause a sharp drop of the selectivity of the partial oxidation products.

*Kontakt: Prof. T. Pöschel, thorsten.poeschel@cbi.uni-erlangen.de*