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VABILO NA PREGLOV KOLOKVIJ / INVITATION TO THE PREGL COLLOQUIUM

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Velika predavalnica Kemijskega inštituta / Lecture Hall at the National Institute of Chemistry; Hajdrihova 19, Ljubljana

Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy: Rational catalyst design within reach?

Recent years have witnessed the introduction of spatiotemporal spectroscopy for the characterization of catalytic solids at previously unattainable resolution and sensitivity. They have revealed that heterogeneous catalysts are more heterogeneous than often expected. Dynamic changes in the nature of active sites, such as their distribution and accessibility, occur both between and within particles. Scientists now have micro- and nano-spectroscopic methods at hand to improve the understanding of catalyst heterogeneities and exploit them in rational catalyst design. In this lecture the latest developments within this field are discussed. The trends include detection of single catalyst particles or molecules, super-resolution chemical imaging, the transition from two- to three-dimensional imaging, selective staining, integration of spectroscopy with electron microscopy or scanning probe methods, and measuring under realistic reaction conditions. Such approaches change the hitherto somewhat static picture of heterogeneous catalysis into one that acknowledges that catalyst materials behave almost like living objects — explaining why many characterization methods from the life sciences are being incorporated into the field of heterogeneous catalysis research. As a showcase, I present the life and death of a catalytic cracking particle. By combining tools it has been possible to investigate inter- and intraparticle heterogeneities in great detail.

Vljudno vabljeni! / Kindly invited!

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