Nejvýznamnější práce

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1. **M. Shamzhy**, M. Opanasenko, P. Concepción and Agustín Martínez. New trends in tailoring active sites in zeolite-based catalysts. **Chem. Soc. Rev**., 48 (**2019**) 1095 - 1149.

This review comprehensively summarizes the recent achievements, trends and guiding principles in designing the most important industrial catalysts – zeolites. Explicit discussion of scientific background, the latest findings and future perspectives for a control over the nature, structure and localization of active centers in zeolites for specific catalytic applications is supported by 34 figures and 11 schemes. A particular focus is given to the recent advances in characterization techniques which assist the "rational" preparation of efficient catalysts for sustainable processes, including valorization of methane, carbon dioxide, and biomass; generation of hydrogen for fuel cells; environmental remediation, among others. Being based on 367 references, this extensive review is an easy to access guide to the important discoveries that have been made in the field of zeolite design over the last few years. **The article is among the top 1% papers "highly cited in the field of Chemistry", according to WOS.** I have written the section of the review on tailoring zeolite framework metal centres.

2. W.J. Roth, O.V. Shvets, **M.V. Shamzhy**, P. Chlubná, M. Kubů, P. Nachtigall, J. Čejka. Post-synthesis transformation of three-dimensional framework into a lamellar zeolite with modifiable architecture. **J. Am. Chem. Soc.** 133 (**2011**) 6130 – 6133

In the article, we firstly proposed and realized the concept of "chemically selective weakness as a route for rational design of new materials". The reported chemoselective disassembly of UTL zeolite into crystalline layers formed the basis for the *development of new synthetic strategy for the preparation of layered and conventional 3D zeolites* via assembly-disassembly-organization-reassembly of appropriate germanosilicate frameworks. I detected hydrolytic instability of germanosilicate zeolites, firstly considered as their disadvantage but later on realized to be controllable and opening new opportunities for materials design. This finding has impacted the development of ADOR strategy for zeolites synthesis, which overturned conventional thinking about zeolite formation and led to the preparation of 15 new zeolites including "unfeasible" ones (e.g., Chem.Soc.Rev., 2015).

3. **M. Shamzhy**, J. Přech, J. Zhang, V. Ruaux, H. El-Siblani, S. Mintova. Quantification of Lewis acid sites in 3D and 2D TS-1 zeolites: FTIR spectroscopic study. **Catal. Tod.** 345 (**2020**) 80 - 87.

Despite progress in the design of heterogeneous titanosilicate catalysts, quantitative information on their acidity remained unavailable, thus precluding the understanding of property-function relationships. The article reports the *development and verification of a method for the quantification of Lewis acidity in titanosilicate catalysts*. I have conceived and supervised the FTIR spectroscopic study of the catalysts (Ph.D. student J. Zhang), written the manuscript and served as a corresponding author.