
Organoelement Chemistry, Organic Synthesis and Catalysis

Organoelement Chemistry, Organic and Inorganic Synthesis and Catalysis

Catalytic reactions are studied mainly by the teams at the Departments of Inorganic and Organic Chemistry, Faculty of Science. The research in the Laboratory of Organoelement Chemistry and Catalysis at the Department of Inorganic Chemistry is focused mainly on the synthesis of new phosphinoferrocene ligands modified by functional groups that enable their applications in the catalysis of synthetically important reaction as well as specific ligands in coordination compounds. Typical representatives are ferrocene phosphines bearing functional amide substituents. Attention is being paid to their preparation and structures, but also to their coordination behaviour and catalytic properties. Naturally, the research encompasses also the adjoining areas such as studies into the biological properties of the synthesized coordination compounds, search for unusual bonding motifs in their structures and electrochemical properties of these ferrocene derivatives to name just few. The Laboratory of Catalysis in Organic Synthesis at the Department of Organic Chemistry aims at development of transition metal-catalysed reactions suitable for the preparation of organic compounds. Reactions studied include [2+2]-cyclootrimerisation reactions, alkene metathesis, cycloisomerisation processes, etc. These methods are applied in the synthesis of natural and bioactive compounds or functional molecules derived from polyaromatic compounds.

Selected outputs

- P. Štěpnička: Phosphino-carboxamides: the inconspicuous gems. *Chem. Soc. Rev.* **2012**, *41*, 4273-4305.
- K. Škoch, I. Císařová, P. Štěpnička: Synthesis and catalytic use of gold(I) complexes containing a hemilabile phosphanylferrocene nitrile donor. *Chem. Eur. J.* 2015, *21*, 15998-16004.
- Korotvička, A.; Císařová, I.; Roithová, J.; Kotora, M. *Chem. Eur. J.* **2012**, *18*, 4200–4207. Synthesis of Aromatic Compounds by Catalytic C–C Bond Activation of Biphenylene and Angular [3]Phenylene.