

Institutsseminar

Valorization of Methane by Carbon-Carbon Coupling: Unexpected Mechanistic Variants and Beyond

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The making of carbon-carbon bonds is at the heart of synthetic chemistry. Particularly challenging are those processes in which methane, the most inert of all hydrocarbons, forms one of the reaction partners. While methane oligomerization, i.e. Fischer-Tropsch chemistry, has experienced recently a renaissance, a detailed mechanistic understanding of this seemingly simple chemistry is lacking.

In this seminar, combined experimental/computational gas-phase studies will be presented, in which under relatively well-defined conditions CH₄ is reacted with metal carbenes and metal carbides. As will be shown, in addition to rather conventional concepts, also mechanistically unexpected and unprecedented processes will be discussed. Quite surprisingly, some of these reactions can be mimicked by "oriented electric fields",^[1,2] which have been recently heralded as "smart reagents in modern chemistry".^[3]

References

- 1) H. Schwarz et al. J. Am. Chem. Soc. 2017, 139, 17201
- 2) C. Geng et al. Dalton Trans. 2018, 47, 15271
- 3) S. Shaik et al. Nature Chem. 2016, 8, 1091

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