Young Career Focus: Dr. Ivana Fleischer (University of Regensburg, Germany)

Background and Purpose. From time to time ***SYNFORM*** meets young up-and-coming researchers who are performing exceptionally well in the arena of organic chemistry and related fields of research, in order to introduce them to the readership. This ***SYNSTORY*** with a Young Career Focus presents Dr. Ivana Fleischer (University of Regensburg, Germany).

BIOGRAPHICAL SKETCH

Dr. I. Fleischer

Ivana Fleischer was born and raised in Poprad, (Czecho)Slovakia. She studied chemistry at the Commenius University in Bratislava (Slovakia), where she conducted her Diploma thesis under the supervision of Professor Štefan Toma in the field of ferrocene synthesis. Following a family break, she moved to Basel (Switzerland) to work with Professor Andreas Pfaltz on mass spectrometric screening methods for chiral organocatalysts. After receiving her PhD in 2010, she joined the group of Professor Matthias Beller at the Leibniz Institute for Catalysis in Rostock (Germany) as a postdoctoral fellow of the Swiss National Science Foundation, where she spent three years. She developed new ruthenium-based catalysts for hydroformylation reactions. Since September 2013, she is a group leader at the University of Regensburg (Germany) and Liebig Fellow of the Fonds der chemischen Industrie. Her research interests center on the field of homogeneous catalysis and organic synthesis with emphasis on method development.

INTERVIEW

SYNFORM | *What is the focus of your current research activity?*

Dr. I. Fleischer | Our research focuses on the development of new catalytic transformations for organic synthesis. The main subjects of our investigations are non-classical C1 building blocks for various metal- and organocatalyzed reactions. We are interested in the whole picture: from the mechanistic understanding of the reactions to useful synthetic applications.

SYNFORM | *When did you get interested in synthesis?*

Dr. I. Fleischer | In secondary school, I participated in the chemistry olympiad and I enjoyed, most of all, topics in organic chemistry – primarily at the theoretical level. I was fascinated by its logic and ease of comprehension. The attraction of science of organic synthesis persisted throughout my studies, and was even strengthened by the exciting and multifaceted laboratory work. I was lucky to be taught by amazingly gifted teachers and lecturers, whom I would like to thank at this point.

SYNFORM | *What do you think about the modern role and prospects of organic synthesis?*

Dr. I. Fleischer | Recent years have shown that catalysis has played a central role in the progress of modern organic synthesis. The current focus lies in the development of efficient, selective and sustainable chemical transformations for the synthesis of value-added chemicals, materials and natural compounds. The interest in utilization and transformation of renewable raw materials is growing and requires new methods. Theoretical chemistry and spectroscopic methods will become more important tools in the elucidation of reaction mechanisms and design of catalyst structures. But still, I think that serendipity will continue to surprise us and provide the most astonishing discoveries.

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SYNFORM | *Your research group is active in the areas of catalysis and new methodology in organic synthesis. Could you tell us more about your research and its aims?*

Dr. I. Fleischer | Our research aims at the construction of carbonyl compounds, which are among the most versatile synthetic intermediates. Our synthetic approach is based on the use of metal- and organocatalysts for the functionalization of the available feedstock with C1 building blocks. The most attractive and especially challenging C1 source is carbon dioxide, which constitutes an easily accessible and non-toxic gas. Its use would expand the resource base, and valuable products could be produced from this renewable carbon source. However, its reactivity is low and new methods are required for its functionalization. Our strategy is based on a two-step protocol, which consists of two catalytic transformations taking place under mild conditions. We also want to apply the developed methods to the synthesis of natural compounds. Figure 1 depicts the overall conversion of CO_2 to complex molecules. In addition, we are investigating new tandem reactions of carbonyl compounds based on one metal-catalyzed and one organocatalyzed step. Such reaction sequences enable the effective formation of several bonds and are characterized by atom-, step- and redox-economy.

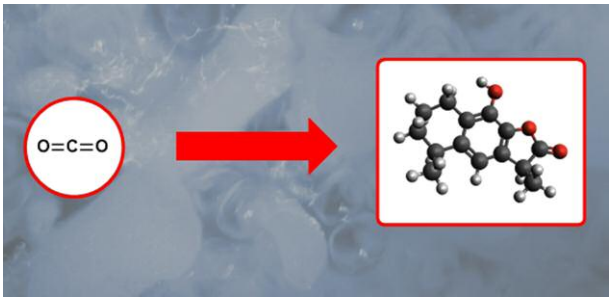

Figure 1 *Envisioned conversion of carbon dioxide into complex compounds*

SYNFORM | *What is your most important scientific achievement to date and why?*

Dr. I. Fleischer | I stand at the beginning of my independent research career, so it is difficult to answer this question. Nevertheless, the ongoing research of my group is very exciting and I hope we will be able to communicate our results soon. So far, we have developed a convenient protocol for acid-catalyzed hydroarylation of activated alkenes (*RSC Adv.* **2015**, *5*, 493) and a new defined ruthenium-based catalyst for the alkoxycarbonylation of alkenes using formates (*Org. Biomol. Chem.* **2014**, *12*, 6972).

Matteo Zanda

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