Young Career Focus: Dr. Tatiana Besset (CNRS, France)

Background and Purpose. SYNFORM regularly 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 Young Career Focus presents Dr. Tatiana Besset (CNRS, France).

Biographical Sketch

Dr. T. Besset

Tatiana Besset obtained her PhD in chemistry (2009) at Grenoble University (France) with Dr. Greene. She then moved to the Westfälische Wilhelms Universität Münster (Germany) as a postdoctoral fellow in the group of Prof. Frank Glorius (Rh C–H bond activation). In 2011, she joined the group of Prof. Joost N. H. Reek at the University of Amsterdam (The Netherlands), as a postdoctoral fellow in collaboration with the Eastman company where she was working on supramolecular encapsulated rhodium catalysts for branched selective hydroformylation of alkenes. Since 2012, she has been a CNRS Associate Researcher in the "Fluorinated Biomolecules Synthesis" group in Rouen, France. In 2017, she was awarded an ERC Starting Grant. In 2018, she defended her habilitation, received the CNRS Bronze medal and the "J.-P. Sauvage" prize (SCF). Her research involves the design of new transformations involving transition-metal catalysis (C–H bond activation) and the development of new strategies in organofluorine chemistry.

INTERVIEW

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

Dr. T. Besset Since the beginning of my career, I have focused on solving synthetic problems by the development of new methodologies for unprecedented organic transformations. Aiming at accessing original scaffolds, our research is dedicated to the elaboration of new tools for the selective C–Rf (Rf = various fluorinated groups) and C–X bond formation by transition-metal-catalyzed C–H activation under mild reaction conditions with a special interest towards C(sp^3)–H bonds. In addition, the design of original fluorinated reagents and their applications for the synthesis of fluorinated molecules, compounds of interest, is also part of our research program.

SYNFORM *When did you get interested in synthesis?*

Dr. T. Besset I have to admit that my interest in synthesis was a rather long journey until today, although I am still in an early stage of my career. I discovered organic chemistry in high school and since then, I have been always fascinated by its omnipresence in our daily life. Throughout my different professional experiences, I confirmed my interest in synthesis and I have learnt to appreciate it by becoming more persistent and curious. Moreover, my background in organic chemistry in various fields, gained in the course of my doctorate and post-doctoral studies, gave me an idea of the incredible possibility of the research in synthesis in organic chemistry.

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

Dr. T. Besset Sometimes underestimated compared to other research areas in chemistry, organic chemistry is the foundation of chemistry: it always was and will continue to be a very active and key research field. Indeed, beyond offering constantly original, efficient and useful synthetic tools

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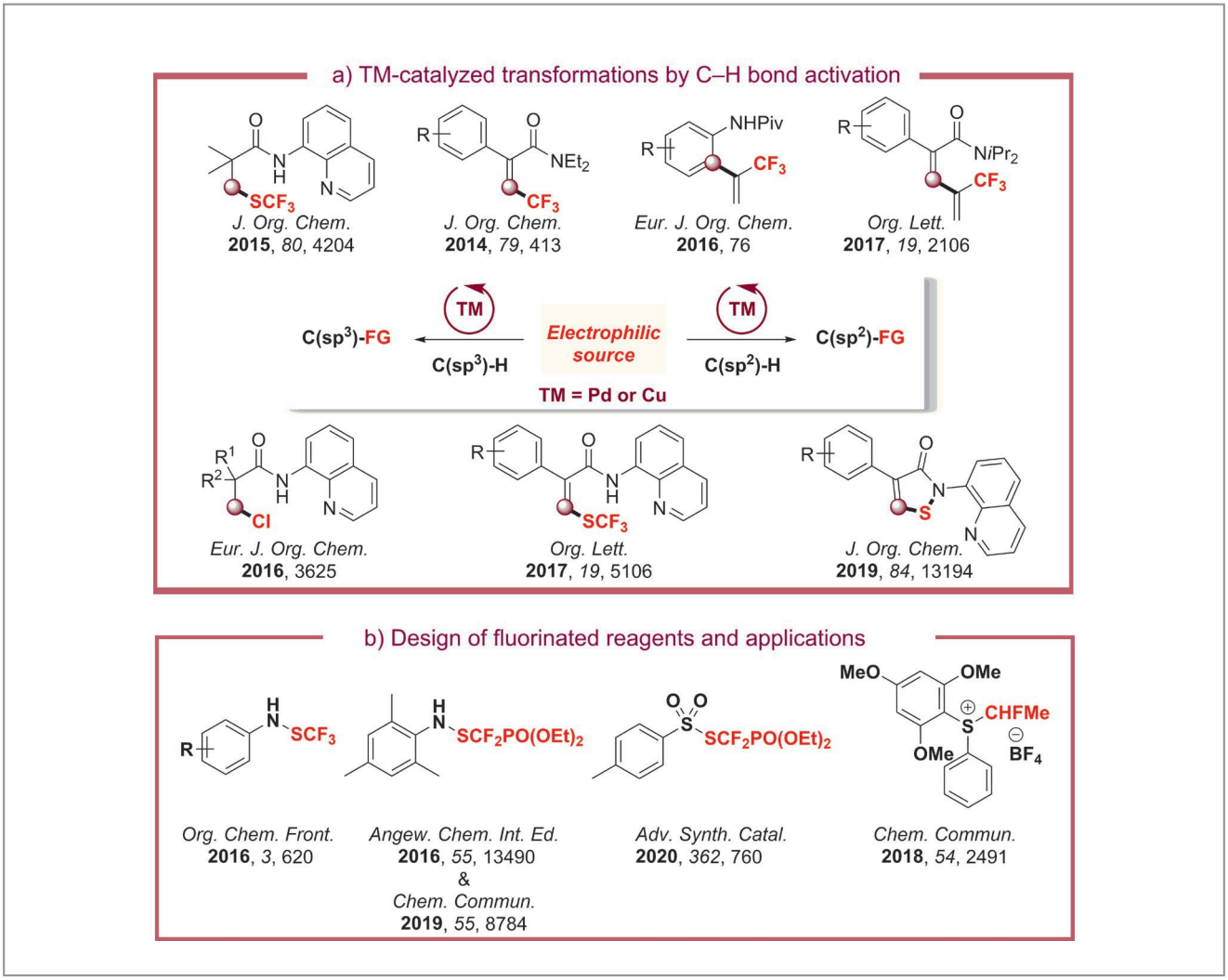
for materials, agrochemicals and pharmaceutical industries as well as access to complex molecules for instance, organic chemistry is a fascinating research field thanks to its infinite possibilities to synthesize molecules. Despite the tremendous advances made over the years, major synthetic challenges are still persistent and stimulate the imagination of the scientific community to push forwards the boundaries of knowledge and to bring cutting-edge technologies to change the way molecules are made. Especially, innovation in the development of more sustainable and efficient solutions with high selectivity will definitively offer groundbreaking achievements.

SYNFORM *Could you tell us more about your group's areas of research and your aims?*

Dr. T. Besset Our research group is focused on the development of efficient and more sustainable synthetic tools to access unprecedented organic scaffolds. With that aim, we have developed innovative strategies for the synthesis of organic compounds and especially fluorine-containing molecules by transition-metal catalysis. Regarding this last aspect, two complementary approaches were elaborated: 1) the development of transition-metal-catalyzed transformations for the introduction of fluorinated groups via eco-friendlier strategies (e.g. C–H bond activation) and 2) the use of fluorinated building blocks to build up compounds of interest. More recently, the design of new reagents for the introduction of highly functionalized fluorinated groups has emerged as an important part of our research program. Special attention was



Scheme 1 Recent synthetic methodologies developed in the Besset lab

also paid to the construction of C–X and C–S bonds by C–H bond activation, especially on C(sp^3) centers, and taking benefit from the tools we developed, our goal is to further explore this chemistry towards enantioselective processes.

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

Dr. T. Besset My most important achievement to date was the development of a methodology for the trifluoromethylthiolation of aliphatic derivatives by Pd-catalyzed C–H bond activation. This approach offered an original tool to functionalize primary C(sp^3) centers with the emergent SCF_3 group to access important fluorinated molecules (*J. Org. Chem.* **2015**, *80*, 4204). This piece of work is a cornerstone in our research. This was our first contribution to the construction of transition-metal-catalyzed C–S bond formation by C–H bond activation, so far restricted to a handful of examples. Moreover, this study constituted a starting point in our group to develop innovative synthetic solutions to achieve value-added scaffolds by combining organofluorine chemistry and C–H bond activation. Hence, these results paved the way to various perspectives and we are expecting future achievement in catalysis and organofluorine chemistry.