Laudatio for the Award Ceremony of the Prix Schläfli Chemistry 2019 of the Swiss Academy of Sciences (SCNAT) for Dr Murielle Delley

Prix Schläfli
since 1866

The Jury of the Prix Schläfli 2019 of the Swiss Academy of Sciences (SCNAT), consisting of Professors C. Bochet (U. Fribourg), T. Bürgi (U. Geneva), C. E. Housecroft (U. Basel, president), K. Koch (PH Bern), L. Nyström (ETHZ), S. Sturia (ETHZ) and O. Wenger (U. Basel), has decided to award the prize to Dr Murielle Delley for excellence in her research resulting in an article entitled 'Local Structures and Heterogeneity of Silica-Supported M(III) Sites Evidenced by EPR, IR, NMR, and Luminescence Spectroscopies'.

Dr Murielle Delley completed her PhD in Spring 2017 having studied in the research group of Professor Christophe Copéret at the ETH Zurich. She gained the highest distinction for her doctoral degree and was awarded the ETH Medal as well as the D.N. Chorafas Award. Since 2017, she has been a Postdoctoral Fellow with Prof. James M. Mayer at Yale University and has been researching into proton-coupled electron transfer reactions on nanoscale surfaces.

Her doctoral research dealt with the development of single-site chromium-containing catalysts in relation to the Phillips ethylene polymerization, a process which is applied to around half of the world's production of high-density polyethylene. Although this is a modern industrial catalytic process, the structures of the active sites and the mechanisms of polymer chain growth have proved highly elusive despite decades of active research in the area.

The paper for which the Prix Schläfli has been awarded was published in the high impacting Journal of the American Chemical Society in 2017. By grafting molecular precursors onto silica surfaces using either amide or siloxide precursors, Dr Delley was able to observe silica-supported chromium(III) sites which exhibit high activity in alkene polymerization and alkane dehydrogenation. A wide range of spectroscopic methods were applied to analyse the nature of the active species and shed light on hitherto undefined structural features. Whereas the siloxide route leads to pure oxygen environments for chromium, the amide route introduces nitrogen into the chromium(III) coordination sphere. Dr Delley showed that this affects the ability to coordinate CO, and also the behaviour of the supported chromium sites in ethene polymerization, in particular, by forming higher amounts of oligomers and a tendency for branched polymers. The relevance of the results to the industrial ethylene polymerization process makes this research highly exciting and internationally important.

We congratulate Murielle Delley on her achievements and wish her well in her future career.

Prof. Catherine E. Housecroft, Platform Chemistry of the Swiss Academy of Sciences

Award ceremony, 25 February 2020 in Zurich, ETHZ

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