Autumn round-up

We provide herein an overview of the present issue while introducing two new features that complement our submission and publication process.

It feels like a long time since we discussed the rise of COVID-19 and its impact on science and publishing[1]. Half a year later, autumn has arrived and unfortunately the pandemic is still front-page news. While we hope that research and policies will soon allow us to defeat this insidious enemy, we once again want to thank our authors and reviewers for their support throughout these challenging months, despite the obvious difficulties.

Meanwhile, in this issue of *Nature Catalysis* the reader will find a balanced selection of our latest published articles, which cover electro-, thermal heterogeneous, homogeneous and biocatalysis. Julia Kunze-Liebhäuser et al., in collaboration with colleagues at the Technical University of Munich, report on the self-activation of single copper crystals during CO electro-oxidation. By combining in situ spectroelectrochemical and microscopy techniques, as well as first-principles microkinetic modelling, the authors show how copper atoms are pulled from the surface by the alkaline electrolyte as adatom clusters and stabilized by CO molecules, which in turn promote their oxidation.

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Switching from this anodic reaction to a related cathodic process, Yu Huang, William Goddard and co-workers electrochemically activate copper nanowires to expose a large portion of surface steps, which promote ethylene formation from CO_2 electroreduction. Using a H-cell setup, they reach a remarkable Faradaic efficiency of >75% for ethylene, with stable operation for over 200 h. Notably, the authors demonstrate that the selectivity to ethylene correlates linearly with the amount of surface steps. In keeping with the topic of CO_2 reduction, Erwin Reisner and colleagues present an insightful Review Article that discusses how local chemical environment effects can be used to design improved photo- and electrocatalysts. A practical classification of such effects based on their physicochemical origin is also provided.

In a collaboration amongst various groups at Karlsruhe Institute of Technology, Jan-Dierk Grunwaldt and co-workers combine complementary expertise to shed light on a rather controversial topic: the nature and performance of Pt/CeO_2 single-atom catalysts for the oxidation of CO and hydrocarbon molecules. Interestingly, the authors find, under operando conditions, that the dispersed Pt atoms reversibly aggregate into small clusters that become the active species. In situ insight is also the signature of the Article by Renato Zenobi, Jian-Feng Li, Jeremy Richardson, Li-Qing Zheng et al., from ETH Zurich and Xiamen University. Here, tip-enhanced Raman spectroscopy is complemented by scanning-tunnelling microscopy, in situ surface-enhanced Raman spectroscopy and density functional theory calculations to capture hydrogen spillover from palladium to gold during the hydrogenation of chloronitrobenzenethiol.

Moving on to homogeneous catalysis, we introduce the work by Corinna Schindler and co-workers, who report on the formation of heterobimetallic aluminium(III)–ion pairs from halide abstraction from $AlCl_3$ that act as superelectrophilic Lewis acids to catalyse carbonyl–olefin ring-closing metathesis. In this way, the authors gain access to six- and seven-membered rings, showing a large substrate scope that includes previously inaccessible targets. On a different note, Troels Skrydstrup and researchers at Aarhus University build on and combine previous concepts to enable the hydroformylation of terminal olefins with a simple yet clever strategy. They use a two-chamber reactor where syngas (CO and H_2) is released in one chamber from two main-group-element compounds — diboron and silacarboxylic acid, which act as syngas surrogates — upon activation with water, and react in the second chamber with the substrate aided by a Rh molecular catalyst. On our last contribution in organic chemistry, Shigeki Matsunaga, Tatsuhiko Yoshino and colleagues present two chiral paddle-wheel diruthenium complexes for asymmetric catalysis — including hetero-Diels–Alder, C–H amination and cyclopropanation reactions. Finally, turning our attention to biocatalysis, Quanjiang Ji, Jianhua Gan et al. provide high-resolution structures of the Cas9 orthologue St1Cas9 in its HNH catalytic state. The authors disclose key mechanistic details for protospacer adjacent motif recognition and perform structure-guided enzyme engineering to expand its targeting scope.

On the publication policy side, the beginning of autumn marks the rollout of two new features in our submission and publication process. From now on, reviewers will be able to choose if they want to be explicitly acknowledged in the published version of the manuscript they have reviewed. For those who opt in, their names will appear in a section at the end of the manuscript; otherwise, a generic text with no names will acknowledge the effort of those reviewers who opt out. We consider that reviewers do an essential job and their contribution is reflected in every publication[2]. Reviewer recognition was trialled at *Nature* in 2016 and subsequently introduced at *Nature Communications* in 2018. The response has been very positive and around 80% of papers in *Nature* have at least one referee named[3]. A few Nature Research journals followed suit in 2019, and we now join them in giving reviewers the credit they deserve. The second seasonal news is the integration into our workflow of the features offered by In Review, a free service from the preprint platform Research Square that has been developed in partnership with Springer Nature. For those authors who opt in, their manuscript will be uploaded as a preprint on Research Square when the paper is sent out for peer review, with the label 'under review at Nature Research'. In Review has been available on almost 300 Springer Nature journals since 2018 and it has been a success. More information about In Review can be found here. Moreover, the platform also offers, as a separate service, an author dashboard that provides real-time information related to the peer-review process of their manuscript, regardless of whether they opted in for In Review or not.

We would like to conclude by welcoming our new editorial team member, Dr Benjamin Martindale, who joins us from *Nature Communications* as an associate editor. Prior to his editorial role, Ben

worked as a postdoctoral research assistant at Harvard University, where he conducted research on the design of materials for sustainable energy conversion via photo- and electrocatalysis. He will be in charge of submissions on photocatalysis and electrocatalysis together with Davide and Marçal, who were handling these areas prior to his arrival. ❐

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