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CHEMCATCHEM Editorial

Carbon in the Catalysis Community

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Carbon is the 6th element in the periodic table and the 15th most abundant element in the Earth's crust. It is the basis of all known life, and is the second most abundant element by mass (about 18.5%) in the human body. The atoms of carbon can be bonded together in different ways to form carbons, such as charcoal, graphite, diamond, activated carbon, and carbon black, which have been used since the pre-historic era and are still widely used in modern industries. The later discovery of new allotropes of carbon, including fullerenes, carbon nanotubes, and graphene, has triggered much multi-disciplinary research on carbon science and technology. This booming area has attracted worldwide attention, particularly in the areas of sustainable chemistry and clean energy.

Carbon is a vital and multifaceted key material in the catalysis community. For homogeneous catalysis, carbon is a major component of the organic ligands surrounding a metallic center. For heterogeneous catalysis, it is well known as a support for dispersing active metals, for its "coking" that can lead to the deactivation of catalysts, or itself as an active catalyst, especially in electronic and photonic catalytic processes. Nowadays, there are a tremendous number of research projects on carbon, many of which extend into different catalysis fields. The roles of carbon cover many aspects from feedstock, catalysts, catalyst supports and reaction medium and it is involved in a range of reactions including organic synthesis, biomass conversion, electrocatalysis, photocatalysis and energy conversion. The possibility of controllable synthesis strategies for nanostructured carbons has inspired the rapid development of effective characterization methods, especially under in-situ or operando conditions. Interdisciplinary cooperation has greatly deepened our understanding of the catalysis process and accelerated the development of carbon in catalysis. This Special Issue of *ChemCatChem* is an attempt to break the barriers between the different catalysis communities and forge new relationships and collaborations. It highlights the versatility of carbon, and shows that the possibilities for carbon use in catalysis are endless.

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To meet this ambitious goal, this Special Issue provides an updated and comprehensive account of "Carbon in Catalysis" with excellent work from all around the world. It covers new approaches for the synthesis of valuable carbon compounds, and the preparation, functionalization, and characterization of nanocarbons both as supports and metal-free catalysts. Most papers introduce original research achievements with many new applications of nanostructured carbons for biomass conversion, electrocatalysis and photocatalysis for hydrogen evolution or oxygen reduction. A few excellent reviews from leading scientists summarize the most recent developments as well as

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provide perspectives in this field. The high scientific quality of all the articles, written by international well-known research groups, will render this special issue a good reference for future studies.

Finally, we would like to sincerely thank all the authors for submitting their excellent work. This Special Issue truly represents global cooperation. Last but not least, we thank the referees and the editors of the *ChemCatChem* editorial team for their purposeful and efficient assistance.

Please enjoy your reading!

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Guest Editors

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