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Editorial

Editorial: Special Issue "New Concepts in Oxidation Processes"

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Oxidation processes, as part of the catalysis field, play a significant role in both industrial chemistry and environmental protection. Without a doubt, the total oxidation reactions of volatile organic compounds (VOCs) and hydrocarbons are critical for environmental pollution prevention and control. Nevertheless, the high incidence of a blend of organic and inorganic compounds (e.g., CO, NOx, SOx, VOC, among others) increases the difficulty of obtaining active, stable, and selective catalytic materials for total oxidation. Another way to eliminate these pollutants is through their selective oxidation to produce highly valuable chemical compounds, such as fuels and alcohols. This approach has also been utilized to yield chemical compounds from biomass. Furthermore, advances in photocatalysis and plasma catalysis permit the intensification of low-energy processes.

The relevance of oxidation processes in the field of environmental catalysis is stimulating interest, as proved by the multiplication of successful Special Issues on this very topic in *Catalysts*:

- *Catalytic Oxidation in Environmental Protection;*
- *New Developments in Heterogeneous Partial and Total Oxidation Catalysis;*
- *Novel Heterogeneous Catalysts for Advanced Oxidation Processes (AOPs);*
- *Trends in Catalytic Advanced Oxidation Processes;*
- *Photocatalytic Oxidation/Ozonation Processes;*
- *Environmental Catalysis in Advanced Oxidation Processes;*
- *Heterogeneous Catalysis and Advanced Oxidation Processes (AOP) for Environmental Protection (VOCs Oxidation, Air and Water Purification);*

This Special Issue is focusing on "New Concepts in Oxidation Processes" and aims to cover recent and novel advancements as well as future trends in the field of catalytic oxidation reactions. Topics addressed in this Special Issue include the influence of different parameters on catalytic oxidation at various scales (atomic, laboratory, pilot, or industrial scale), the development of new catalytic materials of environmental or industrial importance, as well as the development of new methods

to analyze oxidation processes. A total of six papers were published, covering different aspects of oxidation catalysis. Two papers are focused on photocatalysis. The first one proved that the calcination temperature has a significant effect on the photocatalytic performance for removing amoxicillin, leading to the formation of oxidation byproducts and to the decrease of amoxicillin antibiotic activity [1]. The second paper, combining experiments and theory, emphasizes the degradation of commercial acetaminophen [2]. The use of heterogeneous catalysts is then highlighted in the frame of total oxidation of industrial VOCs using a CoAlCeO mixed-oxides catalyst as an alternative to precious-metal-based materials [3], but also for partial oxidation of sulfur-containing volatile organic compound (SVOC) using vanadia-based catalysts, proving the significant role of the composition of the support in the catalytic behavior [4].

Two review papers complete this Special Issue. The first one summarizes the recent advances and trends on the role of metal–support interactions in Ag/CeO_2 composites in their catalytic performance for the total oxidation of CO, soot, and VOCs, and the promising photo- and electro-catalytic applications [5]. The second one consists of a systematic study of catalytic alcohol oxidation on size-controlled platinum nanoparticles in both gas and liquid phases [6] and demonstrates that different molecular orientations in gas and liquid phases lead to very distinct reaction kinetics and mechanisms.

Given these diverse contributions, it is evident that catalytic oxidation processes will continue to flourish. There are still many fundamental questions that remain unanswered, promising a great future for this field. Finally, the Guest Editors would like to sincerely thank all the authors for their valuable contributions.

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