Preface for the special issue: "Catalysis by sulfides and related materials"

Françoise Maugé, Laetitia Oliviero, Carole Lamonier, Christine Lancelot

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We are pleased to bring you this special issue of Catalysis Today compiling a selection of contributions to the 8th Symposium Congress on Molecular Aspects of Sulfide Catalysis (MACS VIII), which was held from the 19th to the 23rd of May 2019 in France, in the beautiful Normandy town of Cabourg, an elegant seaside resort on the English Channel coast.

The first edition of the symposium "Molecular Aspect of Catalysis by Sulfides" was organized in Saint Petersburg in 1998 on the initiative of Henrik Topsoe. For more than 20 years since, every 3 years, MACS has been bringing together academic and industrial experts in the field of catalysis by transition metal sulfides and related materials. This congress has become a major meeting place for the community where the most recent scientific and technological advances are presented and discussed. The 8th edition of the MACS symposium has continued the legacy of H. Topsoe by gathering together more than 140 participants in a melting pot of young and senior researchers (some of them being the young participants of the first editions) with various expertise from academia (70 %) and industry (30 %) across 20 different countries. The most represented countries were, as for the previous symposia, France, the Netherlands and Germany, with a strong and increasing participation of the Chinese and Russian scientific communities. The financial support of our generous sponsors, which greatly contributed to the success of the symposium, must be acknowledged.

This dynamism demonstrates that the improvements of hydrotreating catalysts through molecular aspect understanding are still key to the development of clean, low-sulfur or sulfur-free fuels. In addition to transition metal sulfides, which are the workhorses of hydrotreating processes, closely related catalytic systems such as transition metal nitrides and phosphides also show remarkable features and are worthy of interest. There now appears a groundswell of expectation that catalysis by transition metal sulfides can go far beyond hydrotreating to play key roles in other applications such as the valorization of S-contaminated syngas, synthesis of S-containing platform molecules, and production of hydrogen from electro- and photocatalysis.

These different topics were explored during the congress through 30 oral presentations and 62 posters, as well as 6 plenary lectures given by prestigious scientists, highlighting important advances and developments: Emiel Hensen

from Eindhoven University of Technology (The Netherlands), Ted Oyama from University of Tokyo (Japan), Ib Chorkendorff from Denmark Technical University (Denmark), and Jeppe Lauritsen from Aarhus University (Denmark). Two scientists from industry also shared their experience, Georges Fr´emy from Arkema (France), on high-value and platform sulfur molecules, and Pauline Galliou from Eurecat (France) on the development of sustainable catalyst cycles.

Five major themes are illustrated in this issue: (1) sulfide catalysts for hydrotreating and hydrocracking from model molecules to bitumen, with a majority of papers devoted to new catalyst preparation routes, (2) in-depth characterizations focusing on the development of STEM- HAADF and CoMoS phase quantification from XAS, (3) application of sulfide-based catalysts for the HDS/HDO co-process, (4) innovative catalysts for ODS, an alternative process for desulfurization of model molecules and marine fuels, and finally (5) the use of sulfide-based catalysts for developments in photocatalysis and CO_2 reduction.

We are pleased that the Russian community working on catalysis by sulfides will welcome the next edition of MACS and we look forward to meeting all again in Russia for MACS 2022!

Francoise Mauge´*, Laetitia Oliviero
Normandie Univ, ENSICAEN, UNICAEN, CNRS, LCS, Caen, 14050, France

Carole Lamonier, Christine Lancelot
Universit´e de Lille - Centrale Lille/ENSCL, UCCS, Villeneuve d'Ascq, 59655, France

* Corresponding author. *E-mail address:* francoise.mauge@ensicaen.fr (F. Mauge).