

MAE Crocco Colloquium

Katharina Kohse-Höinghaus

Presents

Burning issues and bright concepts:

Some aspects in combustion chemistry research

Friday, November 30th

12:30 pm Bowen Hall Rm 222



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Current developments regarding the transformation of the energy system aim at more sustainable processes based increasingly on renewables. Nevertheless, established power generation, transportation, and industrial production processes rely substantially on combustion energy supplied by fossil fuels. Emission hazards, climate and health concerns, as well as announcements to phase out combustion engines warrant critical inspection. The end of the combustion era is easily declared – but is it (already) realistic?

With this background, the lecture will aim at giving food for discussion and partial answers to a future role of combustion-related research. With examples of our own and collaborative work, several areas in combustion chemistry will be highlighted. The chemical reactions that release the energy stored in the fuel influence its combustion characteristics and its fate towards undesirable emissions. Advanced spectroscopic and mass spectrometric methods permit to investigate the combustion chemistry in detail. Combustion models and their validation by experiments play important roles to link laboratory results to practical systems. Key issues discussed in the presentation include inspection of the reactions at low temperatures for conventional and alternative fuels and their mixtures and the formation of toxic species and soot emissions.

While combustion processes with a lower carbon signature and reduced emissions might rely on new approaches and alternative fuels, combustion science is not limited to understand the process of burning. Knowledge across techniques in a future energy perspective is desired, and many facets that have developed from the combustion energy community are useful building blocks in this context.

Katharina Kohse-Höinghaus is a professor of Physical Chemistry at Bielefeld University, Germany, since 1994. Her research focuses on combustion chemistry and diagnostics with a multidisciplinary approach encompassing aspects of chemistry, physics, material science and engineering. Kohse-Höinghaus has been honored with prestigious awards, professorships and lectureships for her scientific contributions, including the German Cross of the Order of Merit, the Giulio Natta Medal in Chemical Engineering of the Politecnico di Milano, and the three highest awards for international scientific cooperation issued by the Chinese Academy of Sciences and the People's Republic of China. Furthermore, she is a Fellow of the Combustion Institute and was awarded its Alfred C. Egerton Gold Medal in 2018. Professor Kohse-Höinghaus is a member of five academies, including both, the National Academies of Sciences and of Engineering of her country as well as the European Academy of Sciences. She has also served in numerous functions in professional societies and academic organizations, including the German Council of Sciences and the Humanities that advises the government as well as the International Advisory Board of the Alexander von Humboldt Foundation. She was president of the Bunsen Society of Physical Chemistry and member of the senates of the German Research Foundation and of the Helmholtz Association of National laboratories. In the combustion field, she has served as editor-in-chief of *Combustion and Flame*, and she has been the president of the Combustion Institute from 2012-2016. Kohse-Höinghaus is also a dedicated teacher and mentor to early-career researchers and the founder of Germany's first hands-on school lab at a university as early as 1999.