

Understanding combustion chemistry as a guide to cleaner processes

Katharina Kohse-Höinghaus,
Department of Chemistry, Bielefeld University, Germany

While fossil fuels still contribute more than 80% of global primary energy, combustion can lead to a number of dangerous emissions. It is therefore important to understand the chemical mechanisms that give rise to such pollutants. Especially carbon dioxide, nitrogen oxides, and soot emissions receive attention because of their impact on climate, environment, and human health. With efforts to reduce the carbon footprint, alternative fuels, potentially from biomass, are being advocated, as well as novel combustion strategies. Such measures introduce new challenges, including different physico-chemical conditions and additional reaction pathways.

The talk will present recent examples of our own and collaborative work that highlight powerful in situ diagnostic methods to probe gas-phase reactive system in laboratory configurations, and results from prototypical fuels and fuel combinations will be given. The importance of the fuel's molecular structure on the formation of harmful species is one of the leading aspects for a balanced evaluation of its properties. Against this background, discussions are expected that might also address the future of combustion in the context of the energy transformation.