

# VUV-Radiation for Combustion Chemistry Analysis

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Despite the fact, that in recent time renewable energy sources like wind and solar power show a tremendous increase, more than 85% of the world energy is still converted by combustion. It is mandatory to adopt cleaner and more efficient ways to use fossil resources until other energy carriers will replace traditional combustion. High efficiency and low pollutant emissions at the same time is a challenging task for modern combustion research. New developments affect not only the technical design of combustion processes in engines, gas turbines, and power plants. Especially the formation of pollutants and the development of concepts that reduce undesired and harmful emissions need detailed information on the chemistry of combustion processes.

From a chemical perspective, combustion involves hundreds of different reactive molecular species and thousands of chemical gas phase reactions. Understanding these complex processes must often rely on accurate information regarding the compounds involved in the reaction, including their respective structure and abundance. Different lab-scaled experiments have been designed in order to understand the chemical details of combustion processes. Molecular Beam Mass Spectrometry (MBMS) has been proven as valuable technique in getting access to the chemical species pool of combustion processes. The combination with synchrotron-generated tunable vacuum-ultraviolet (VUV) radiation as ionization source has enabled the detection of previously elusive species, a better understanding of fuel-specific reaction pathways and has assessed the predictive capability of reaction models.

This talk gives an overview about the use of VUV-radiation in the field of combustion analysis. Some aspects concerning advantages and unresolved problems are highlighted and it will be discussed how VUV metrology can give valuable improvements to the field of combustion research.