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Understanding the combustion chemistry of biomass fuels: Important for future developments in clean energy

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Understanding the combustion chemistry of biomass fuels: Important for future developments in clean energy

Humboldt Colloquium "Research without Borders - Alexander von Humboldt's Legacy Today", 11-13 April 2019, Madrid, Spain

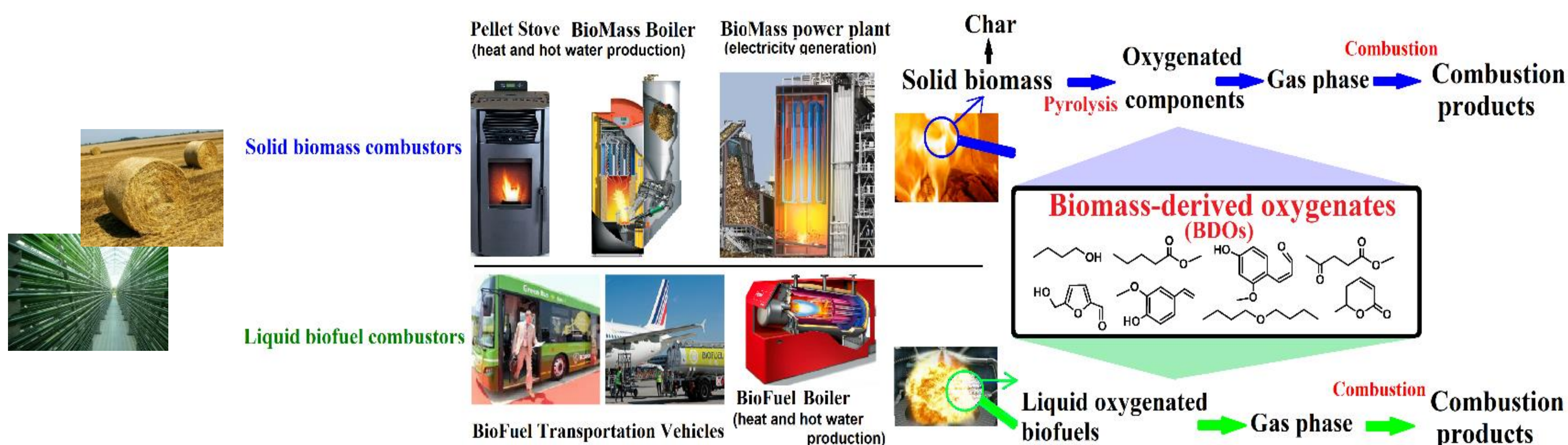
Introduction

More than 80% of the world's primary energy supply is currently produced through combustion process to provide heat and energy services. Fossil fuels (coal, petroleum oil, natural gas) still dominate energy supplies, approximately 90% worldwide and 80% in the European Union (EU), leading to large amounts of emissions of greenhouse gases, particularly CO₂, which is a major cause of global warming and changes in climate systems.

The use of biomass fuels (solid biomass and its liquid derived-oxygenated biofuels), to substitute the fossil fuels, has been identified as a sustainable solution for mitigating global CO₂ emissions and improving the energy security. However the chemical influence of biomass fuels on emissions of ultrafine soot nanoparticles and other toxic species such as aldehydes or oxygenated polycyclic aromatics. Therefore a better understanding about the combustion chemistry of biomass fuels on the formation of these pollutants are important for future developments in clean energy.

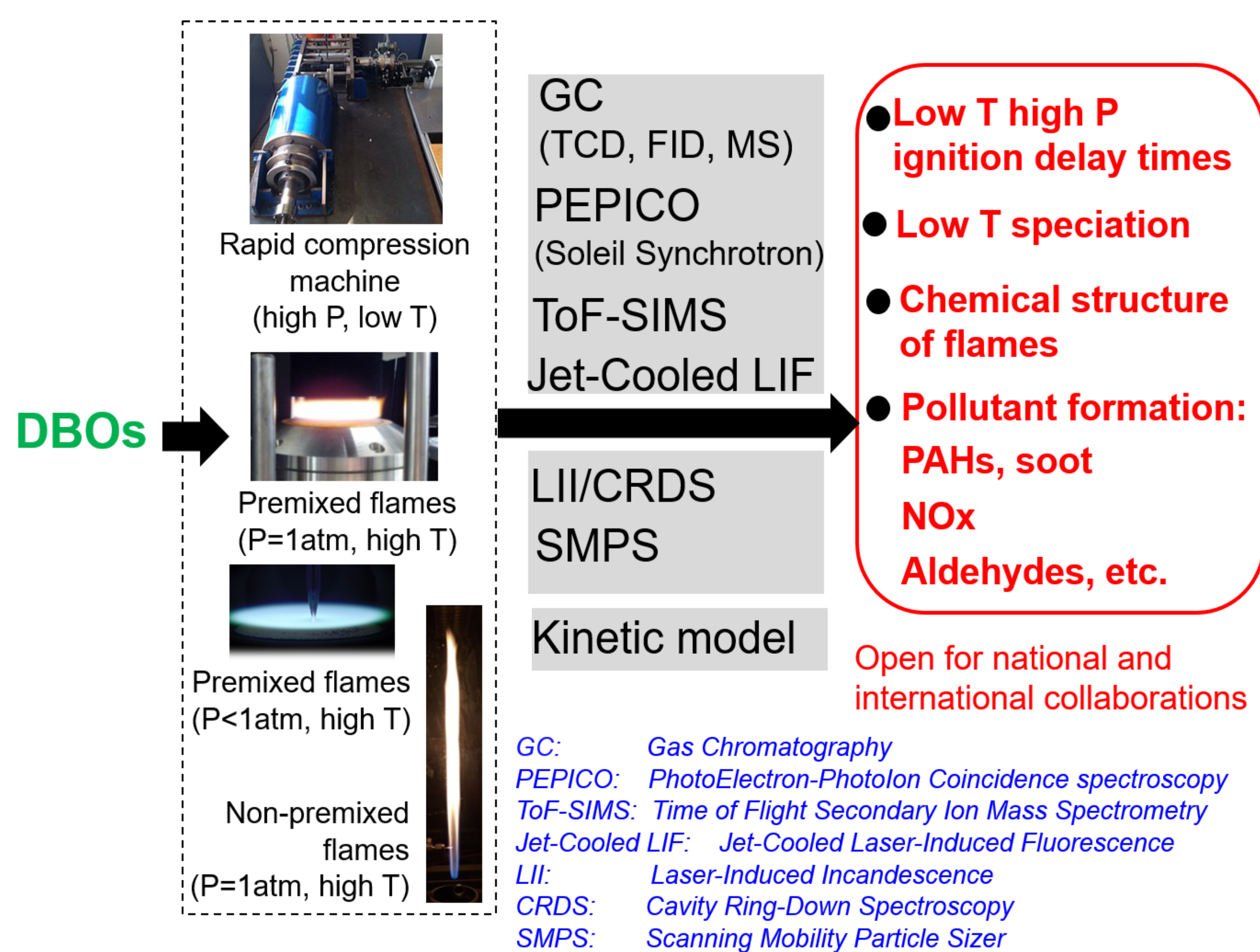


BDOs play a central role in the combustion of biomass fuels



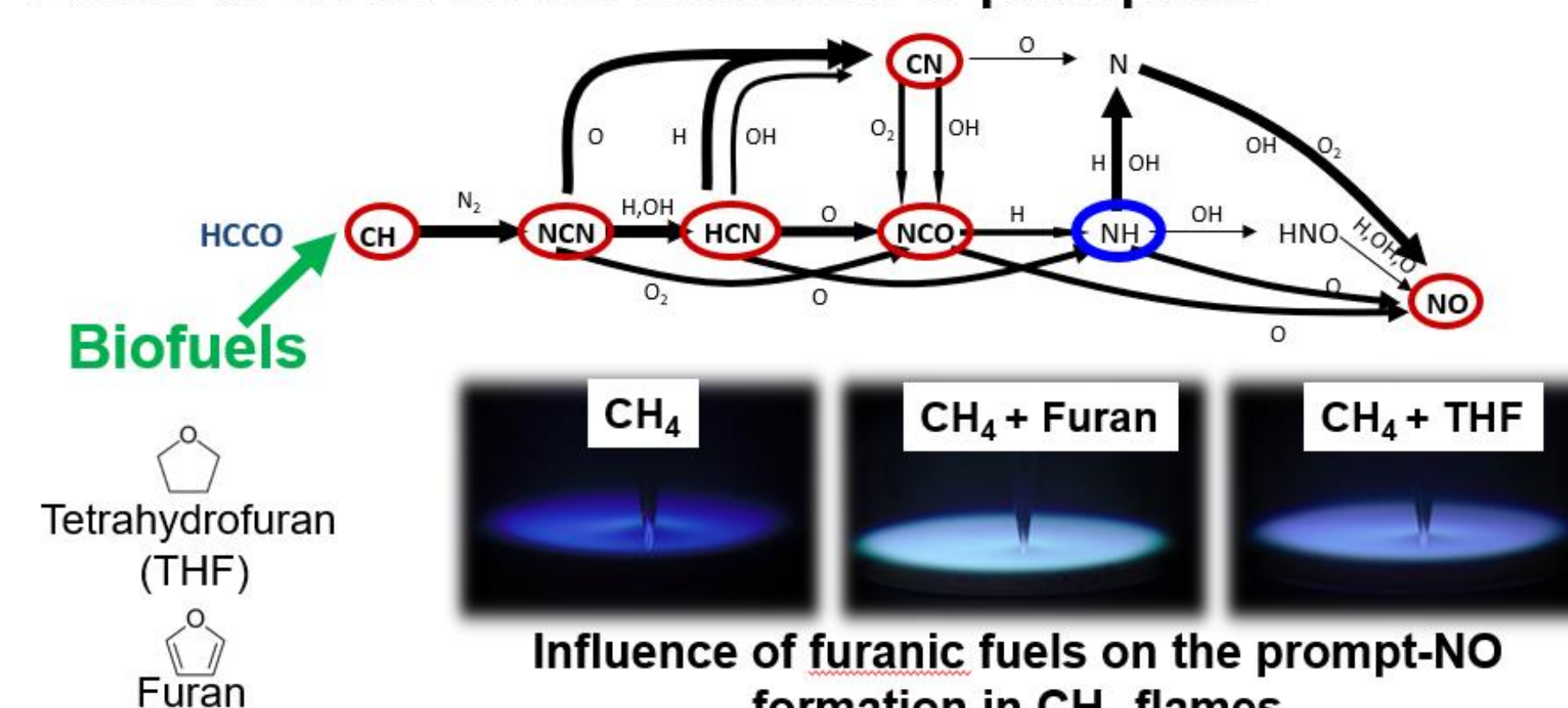
Research on the combustion chemistry of BDOs

At PC2A



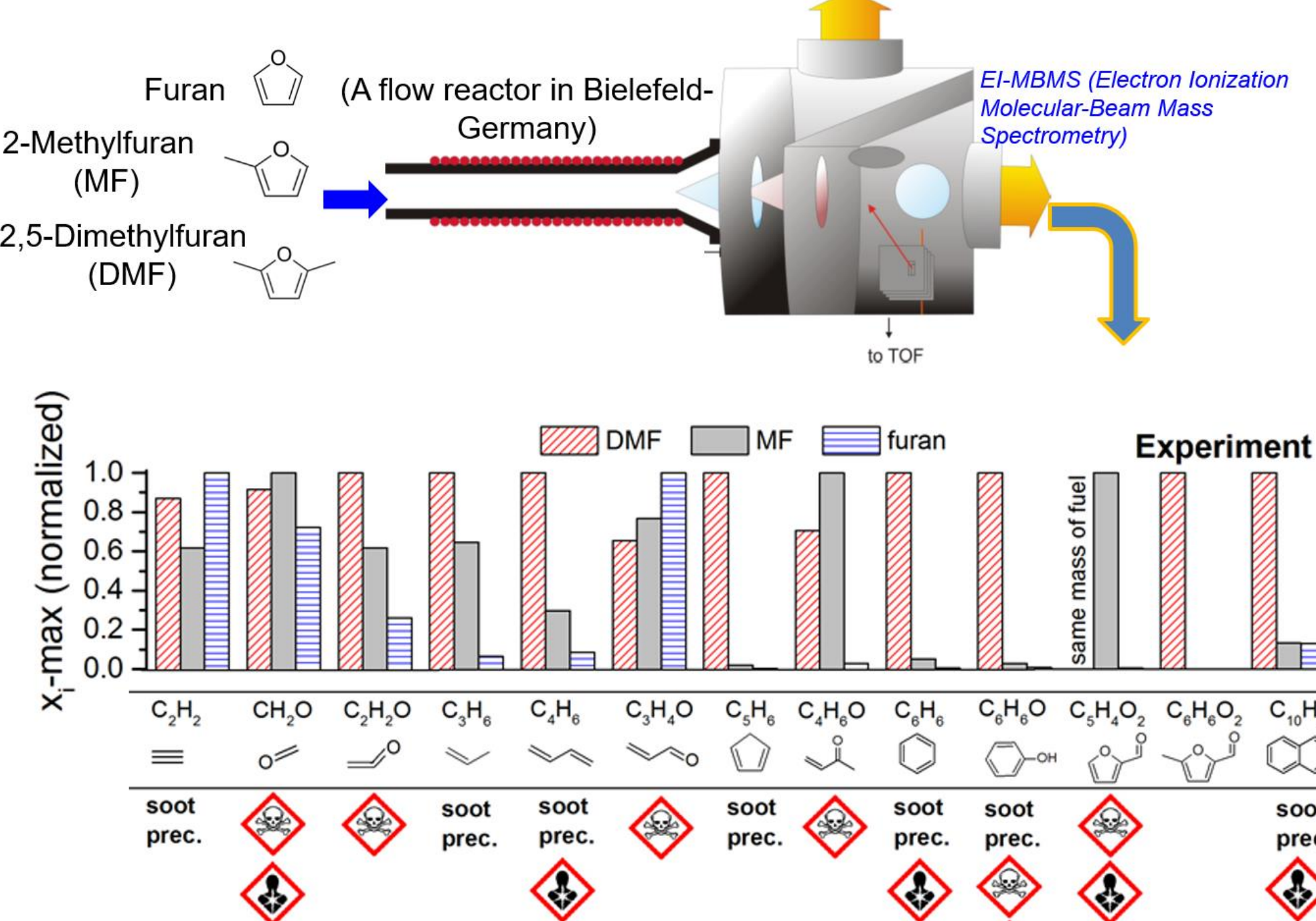
Examples of results

Effect of BDOs on the formation of prompt-NO



Refs: [N. Lamoureux et al. Combust. Flame 2016] By N. Lamoureux, P. Desgroux, L. Gasnot and coworkers
 [Thesis of L. Giarracca 2018]

Oxidation of furanic BDOs: Several toxic species and soot precursors are formed



Ref: [Tran et al. Combustion and Flame 2017]

Acknowledgements

Contributors to the presented studies:



One of perspectives

