Bachelor/Master Thesis
Investigation on biomass combustion chemistry: oxygenated poly aromatic hydrocarbons formation from anisole

Biomass combustion is one of the future clean energy sources to mitigate global warming and air pollution. One interesting bio-fuel is anisole, which could also represent the molecular structure of lignin from biomass. Understanding the combustion chemistry can help develop better strategy for energy harvest in practical combustion system, e.g. engines and gas turbines.

In this project, anisole combustion chemistry will be investigated in counterflow diffusion flames. Specific attention will be paid to the oxygenated poly aromatic hydrocarbons (OPAH) to explore their formation pathway, because OPAH have higher toxicity to human health and environment than particular matter (PM) with their special structures. The molecules in the flames will be identified and quantified by a time-of-flight molecular beam mass spectrometry (ToF-MBMS) to allow direct detection of large OPAH molecules. Collected data will widen current understanding of anisole combustion chemistry in a more practical diffusion flame system.

Figure 1: Example of mass spectrum
Figure 2: Picture of anisole flame

Tasks:
- Learn the operation procedure for counterflow burner and ToF-MBMS
- Perform daily experiments
- Assist in regular maintenance of the experimental equipment
- Assist in data post-processing

Requirements:
- Fluent in English. Good in German will be a plus.
- Experience in Matlab and LabView
- Self-motivated & Strong learning ability

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