

2020 Helmholtz – OCPC – Program for the involvement of postdocs in bilateral collaboration projects

PART A

Title of the project: Secondary Aerosol Formation by Atmospheric Mixing of Biogenic and Anthropogenic Volatile Organic Compounds

Helmholtz Centre and institute: Forschungszentrum Jülich GmbH, IEK-8: Troposphäre

Project leader: Prof. (adj.) Dr. Thomas Mentel

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Description of the project:

Secondary aerosols are important constituents of the atmosphere. They are formed by gas-to-particle conversion during the (photo-) oxidation of trace gases. Biogenic volatile organic compounds as well as anthropogenic volatile compounds form Highly oxygenated multifunctional hydroperoxides and percarboxylic acids (Ehn et al., 2014). Highly oxygenated compounds have potentially very low vapor pressures, thus condense easily and are key players in secondary organic aerosol formation (SOA). Very recently we showed that formation of highly oxygenated organic molecules is hindered in atmospheric mixtures, which made SOA formation processes highly non-linear (McFiggans et al., 2019). The key to understand the process are (highly oxygenated) peroxy radicals (RO_2). In this project we will investigate the interaction in mixtures of biogenic (terpenoids) and anthropogenic emissions (aromatics).

In cooperation with a partner from the People's Republic of China we want to study the efficiency of secondary organic aerosol formation in atmospheric mixtures in a new continuously stirred flow reactor setup (SAPHIR*). As a novel tool we will apply high resolution bromide- and nitrate-chemical ionization mass spectrometry (CI-TOF-MS) with the goal to simultaneously detect highly oxygenated organic molecules, HO_2 and RO_2 radicals.

Description of existing or sought Chinese collaboration partner institute:

We have an ongoing cooperation with the College of Environmental Sciences and Engineering, Peking University, Beijing. Within this very fruitful cooperation we are studying the daytime and nighttime oxidation of atmospheric VOC in our simulation chamber SAPHIR applying CI-TOF-MS. With the current project we hope to deepen the successful collaboration with PKU, especially with groups with interest in mass spectrometric methods. We are open for new partners with strong interest in tropospheric aerosols and the process of aerosol formation. The partner in the PR of China should be active in experimental work with experience in laboratory studies, preferably applying mass spectrometry. It would add extra value if the partner in PR China could contribute to the air pollution aspects and cover the health aspects of within the planned research.

Required qualification of the post-doc:

- PhD in chemistry, physics or environmental science
- experience in mass spectrometry, analytical or atmospheric chemistry, aerosol science
- the applicant should be experimentally oriented with additional skills in programming and data administration

PART B

Documents to be provided by the post-doc, necessary for an application to OCPC via a postdoc-station in China, which is affiliated to a research institution like a university:

- Detailed description of the interest in joining the project (motivation letter)
- Curriculum vitae, copies of degrees
- List of publications
- 2 letters of recommendation
- Proof of command of English language

PART C

Additional requirements to be fulfilled by the post-doc:

- Max. age of 35 years
- PhD degree not older than 5 years
- Very good command of the English language
- Strong ability to work independently and in a team