

2017 Helmholtz – OCPC – Programme for the involvement of postdocs in bilateral collaboration projects

PART A

Title of the project: Autoxidation in photochemistry and secondary aerosol formation

Helmholtz Centre and institute:

Forschungszentrum Jülich, Institute of Energy and Climate Research, Troposphere (IEK-8)

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

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Description of the project:

Aerosols are important constituents of the atmosphere. They are either emitted directly or formed by gas-to-particle conversion during the (photo-) oxidation of trace gases. In the latter, a process called autoxidation was recently discovered (Ehn et al., Nature, 2014), which is possibly of great general importance in atmospheric chemistry. Products of the autoxidation are highly oxidized multifunctional hydroperoxides and percarboxylic acids (Mentel et al., ACP, 2015), which have low to extreme low vapor pressures, thus condense easily and form secondary organic aerosols (SOA). We will study the importance of autoxidation in the photo-oxidation of biogenic and anthropogenic volatile organic compounds (VOC) related to SOA formation. Oxidation products from atmospheric VOC may modify the cloud forming properties of atmospheric particles and in addition have the potential to act as exogenous ROS, when inhaled or otherwise incorporated (Li et al., Shang et al., EST, 2012)

In cooperation with a partner from the People's Republic of China we want to perform and exploit studies in a new continuously stirred flow reactor setup (SAPHIR++) under aspects of secondary organic particle formation on inorganic substrates, including mineral dust, in relation to climate and health effects. As a novel tool we will apply super high resolution acetate- and nitrate-chemical ionization mass spectrometry (CIMS) as well as acetate-FIGAERO-CIMS, which measures simultaneously gas-phase and particulate-phase composition by in-situ thermal desorption mass spectrometry.

Description of existing or sought Chinese collaboration partner institute:

We are looking for a partner with strong interest in tropospheric aerosols and the process of aerosol formation in context of air pollution and climate change. Since we are covering the

cloud/climate aspect ourselves within the proposed project, it would add extra value if the partner in PR China could contribute to the air pollution aspects and cover the health aspects of tropospheric trace gases and aerosols. We are looking for a partner who is active in experimental work with experience in laboratory studies and in field observations.

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:

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

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