The Department of Chemistry at the Johannes-Gutenberg University in Mainz offers a

**Master thesis in the field of analytical chemistry**

**Subject: Method development for sulphur and halogen speciation for volcanic research**

Start of work: by arrangement

Volcanoes emit large amounts of reactive trace gases, including sulphur and halogen compounds, and non-reactive gases such as carbon dioxide (CO$_2$) into the atmosphere. Measuring the ratios of emitted CO$_2$ and sulphur dioxide (SO$_2$) as well as the SO$_2$ emission rate are established methods for monitoring volcanic activity. From these measurements, conclusions can often be drawn about volcanic processes below the earth's surface, which are otherwise difficult to observe. Furthermore, released sulphur and halogen compounds can influence atmospheric chemical processes on a regional as well as global scale. However, for a number of key compounds, analytical and sampling methods are lacking to determine them in inaccessible crater regions or volcanic plumes. Here, miniaturized sampling systems can be used, which can then be guided into the plumes or craters by UAVs (e.g. Multicopter/Drones).

**Task description**

- Production of gas standards (reference gas sources)
- Development of selective sampling techniques (e.g. diffusion separators)
- Development and application of GC/MS methods (if necessary also LC/MS)
- Adaptation of the method for UAV suitability
- if necessary, testing of the method within the scope of field measurements
- Presentation of the results

**Requirements**

- Study with the subject chemistry, biomedical chemistry or a comparable course of studies
- Solid basic knowledge of analytical chemistry
- Interest in experimental work
- Independent, motivated and analytical working style
- Experience with physical computing platforms (e.g. Arduino) desirable

Please send your application to t.hoffmann@uni-mainz.de

Contact person for further information on the advertised position: Prof. Dr. Thorsten Hoffmann (Tel. 06131/3925716, e-mail: t.hoffmann@uni-mainz.de).