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Innsbruck, March 07, 2025

JOB POSTING

PHD CANDIDATE POSITION

Within the framework of the FWF project "**Resolving anomalous clathrate hydrate preservation**" a three-year doctoral position is to be filled as soon as possible for

a chemist or physicist or equivalent.

The position will be based at the University of Innsbruck with FWF personnel cost rates at 25 hours per week, currently amounting €2,322 gross per month (paid 14 times a year).

Invited to apply are graduates with a master's degree in chemistry, physics, or equivalent natural sciences, as well as individuals whose graduation is imminent.

The project focuses on clathrate hydrates, which are inclusion compounds of guest molecules in ice cages. These compounds can be used for the storage of gases such as hydrogen or carbon dioxide at high density and are therefore of significant technological relevance in the contexts of climate change and energy transition. Besides, methane clathrates (see burning ice in Fig. below), which naturally occur in permafrost and coastal seabeds, represent the largest carbon reserve in nature, far exceeding all coal, oil, and natural gas reserves combined.

In the context of the dissertation, the formation and decomposition processes of clathrate hydrates are explored. These processes remain largely unresolved.

Notably, the phenomenon of self-preservation, which occurs under pressure and temperature conditions where, thermodynamically, decomposition should prevail, is still not well understood

To address the unresolved questions, various experimental methods are available, including microtomography, Raman and infrared spectroscopy, electron microscopy, X-ray diffraction, calorimetry, and thermogravimetry. These can be supplemented by computer-aided simulations (e.g., FEM, MD) to test and further develop existing and new hypotheses and models.

Stays abroad during the dissertation are possible and encouraged, particularly for beam times at large facilities for neutron and high-energy X-ray measurements (e.g., J-PARC in Japan, Rutherford Appleton Lab in England, DESY in Hamburg, ILL in France), as well as for presenting results at relevant conferences (such as Gordon Research Conferences in the USA).

The timeframe for the position is three years – during this period, all experimental work for the dissertation will be completed.

Interested in uncovering the secrets of burning ice together in a young team? Then please contact the project leaders via stefan.arzbacher@uibk.ac.at and thomas.loerting@uibk.ac.at.

We look forward to your application!



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