

Master's thesis

We are looking for a master student to work on the topic titled:

“Interaction of desferrioxamine B and E with metal ions in competitive environment”

at Helmholtz Institute Freiberg for Resource Technology, Helmholtz-Zentrum Dresden-Rossendorf in Dresden, Germany.

Project description

The lanthanides and other strategic elements such as Ga, In, Ge are very important for securing future energy needs as well as supply to the high-tech industry. There are no ores for such metals and these metals are always recovered as a by-product from the mining operations of other metals. Thus, it is important to **recover these metals from secondary resources such as industrial wastewaters**.

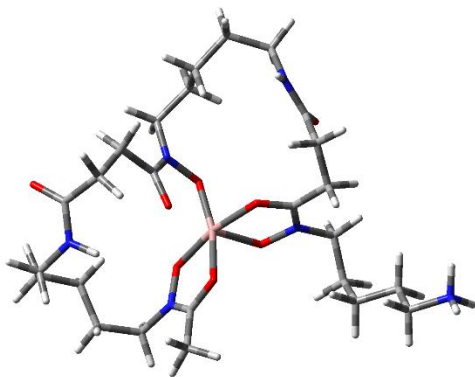


Figure 1 – DFOB complexing Ga as determined by DFT calculations and IR spectroscopy.

The challenge in the recovery of strategic metals from the wastewaters is the presence of other “**unwanted**” **metals or contaminants**. Thus, a highly selective ligand is required. **Siderophores are highly selective towards Fe³⁺** and due to similar ionic radius, their selectivity is extended to **Ga³⁺ as well as In³⁺**. However, the selectivity of siderophores towards other lanthanides individually as well as in **competitive environment is not known**. These findings are very important to develop a **process for the recovery of the strategic elements**.

Working plan

The work plan will involve analyzing the interaction of strategic metal individually and in competition with **desferrioxamine B and E** **siderophores**. The interaction will be studied by means of **high performance liquid chromatography (HPLC), mass spectrometry (MS), isothermal titration calorimetry (ITC) experiments, infrared spectroscopy and density functional theory calculations (DFT)**. The student will have an opportunity to work and gain expertise on 3-4 of the above mentioned techniques.

Requirement

The student should have **microbiology, chemistry, civil or environmental engineering background**. The student should be able to **communicate in English**.

Contact

Dr. Rohan Jain, E-mail – r.jain@hzdr.de, Ph. No. +49 351 260 3138

Funding opportunities are available for carrying out master thesis at HIF, HZDR.