Training Opportunity for Luxembourgish Trainees

Reference	Title	Duty Station
LU-2022-HRE-RS	**Oxygen and Metal Extraction from Lunar Rocks**	**ESTEC**

Overview of the mission

This position will be based in the SciSpace Team in the Human and Robotic Exploration Directorate and will work with a cross-directorate team on improving understanding of processes that might be used to produce oxygen and metals on the Moon.

In Situ Resource Utilisation (ISRU) will be a core element of sustainable exploration on the Moon and Mars. The realisation of this must be underpinned by processes that convert the materials found at these locations into usable products. In support of a wider effort to build up capability and knowledge in the domain, ESA has established an in-house research activity into electrochemical processes to reduce rocky materials to oxygen and metallic products.

Overview of the field of activity proposed

You will collaborate with an interdisciplinary team working on investigating and optimising ISRU processes for application on the lunar surface. You will work on an emerging technology for lunar resource extraction and perform electrochemical experiments using simulated lunar regolith material. Areas of research will include investigating novel anode materials, analysis of the electrolyte and metallic by-products, and optimisation of the processing parameters. You will also be tasked with examining the process adaptations that will be required for a future lunar pilot plant to operate autonomously and efficiently in the unique lunar environment. You will collaborate with researchers at the European Space Resources Innovation Centre (ESRIC) in Luxembourg to strengthen the end-to-end process value.

This position will combine experimental work, materials characterisation, and process design work. The outcomes and expertise gathered through the laboratory-based research activities will be used to support the preparation of future lunar missions and payload study activities.

Required background

- Master's degree in chemical engineering, materials science, metallurgy, or related discipline
- Practical experimental research experience preferred
- Technical knowledge of characterisation techniques, electrochemistry, and python will be an asset; knowledge of ISRU field and lunar geology will be beneficial
- Good interpersonal and communication skills
- Ability to work in a multi-cultural environment, both independently and as part of a team
- Fluency in English and/or French, the working languages of the Agency