

Freiberg researchers open joint laboratory for luminescence research

The Helmholtz Institute Freiberg for Resource Technology (HIF) and the TU Bergakademie Freiberg (TUBAF) have been active in the field of luminescence research for many years. At TUBAF, spectroscopic methods are mainly used to characterise defects in semiconductor and oxide materials. The competences are now being further expanded in order to make spectroscopic measurements usable for the characterisation of resources and materials as well. "With the establishment of a joint laboratory at the HIF site in Chemnitzer Straße, the appropriate framework has now been created for these research activities, thus further expanding the scientific cooperation between TUBAF and HIF," says Rector Klaus-Dieter Barbknecht at the opening of the new LUNA Lab. The lab is equipped with devices from Freiberg Instruments, a TUBAF spin-off that develops special measurement technology.

The lab is focused on method development in the field of spectroscopic investigations for the exploration and characterisation of materials, for example laser-induced fluorescence. Luminescence spectroscopy refers to the analysis of the optical radiation of a physical system that is produced during the transition from an excited state back to the basic state after stimulation with externally supplied energy. The name of the laboratory is derived from this phenomenon of the emission of optical radiation (light), which is measured in the dark because of the low signal intensity: LUNA Lab (lat. luna for moon).

In the coming years, research work is planned on two focal points: "in the field of spectroscopy, we want to investigate characteristic luminescence properties for mineral identification, for example in relation to critical raw materials such as rare earth elements. This will allow us to develop routines for mineral mapping and at the same time improve the data processing procedures. The integration of results from hyperspectral imaging is also planned," explains Dr. Margret Fuchs, head of the laboratory on the part of HIF. "In addition to geo-chronological investigations, we are particularly interested in the fundamental phenomena and properties that lead to the luminescence phenomena in the materials," says Prof. Dr Johannes Heitmann, head of the laboratory on the part of TUBAF.

The measuring instruments used are adapted and optimised according to the scientific specifications. Thus, the LUNA Lab contributes to the instrumental advancement and the scientific understanding of the processes involved in optically stimulated dating.