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The Critical Raw Materials Sc, V, Nb, Ga from metallurgical residues for the green energy and digital transition

Web SEMINAR co-event

ScaVanger-Scale-up-Valore projects

www.scavanger.eu; www.scaletechnology.eu; www.kic-valore.eu
<https://www.ifad.tu-clausthal.de/>

For postgraduates (BSc, MSc and PhD students, young researchers)

Presentations: End of November 2022 (exact dates will be fixed)

Introduction

The industrial implementation and manufacturing of new green technologies and products (e.g., hydrogen driven energies (SOFC, SOEC), thin films, 3-D printing technologies, innovative light high resistant alloys, 5G) in Europe require a continuous and price-competitive supply of scandium, niobium, vanadium, and gallium. These metals are on the critical raw material list of the EU.

The EU as one of the global players in extractive metallurgy, provides high amounts of volumes of residues from metallurgical processing as solutions and filter cakes which are precious resources for these metals. Residues from TiO₂ pigment production and from aluminium production from bauxites can cover e.g., the scandium demand of about 30 tpy, forecasted in 2028, and contribute for niobium, vanadium, and gallium to EU industrial needs.

This Web seminar is addressed to BSc, MSc and PhD students to discover and study these 4 elements in the light of circular economy and the universe of extractive metallurgy to reach marketable products for the growing markets of light, resistant and recyclable products.

Objective

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Students form an international group of 2 and prepare a 30-minutes presentation on a topic chosen from the topic list. They prepare and present the results of their work together in the webseminar session organized in December.

The group must be composed of two students from two different countries. Each group has two advisors from the three EIT projects (ScaVanger, Scale-up, Valore and TU Clausthal). Students prepare within two months (September-October 2022) with 2 meetings with the advisor (at the beginning and 1 week before the online presentation. The presentations for all will be scheduled as a conference in subtopic sessions in November 2022.

The link for listening to the presentations can be diffused at the projects and international scale (companies, academia etc..).

Each group writes a ½ page abstract in English on their topic. Depending on the quality of the results, students will be encouraged to write a short article for a broader public.

Outcome: students learn and understand deeply the Sc, Nb, V and Ga market and challenges to get high quality products for the specific industrial sectors. They learn international teamworking and get knowledge on their specific topic, and on the subtopics of their colleagues. Furthermore, it provides an important network for future careers.

Learning assessment: evaluation of the presentations and delivery of a certificate (by ScaVanger-Scale-Up-VALORE).

SUBTOPICS

1. Scandium: the rocket of the future? (Advisor(s): NTUA: Thymis Balomenos; VIC: Henk van der Laan)
2. Primary and secondary resource materials for Sc, V, Nb production (Advisor: Catura Geoprojects: Beate Orberger, B. Yagmurlu (TU Clausthal)
3. Extractive hydrometallurgy for Scandium intermediate products (advisory: KTH: Kerstin Forsberg, NTUA: Elena Mikeli, TU Clausthal: Bengi Yagmurlu)

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4. From intermediate Sc-products to customized Sc-products (RWTH-IME: Richard Schneider, MEAB: Carsten Dittrich/Robin Scharfenberg, TU Clausthal: Bengi Yagmurlu)
5. Economy of vanadium and its extractive hydrometallurgy for intermediate and customized product design (advisors: KTH: Kerstin Forsberg/Michael Svärd)
6. Economy of niobium and customized product design using pyrometallurgical alloy production (advisors: RWTH-IME Carolin Maier-Richard Schneider)
7. Market and market strategies for scandium (advisors: RWTH CON: Yashvi Baria, VIC: Henk van der Laan)
8. Market and strategies for niobium and vanadium (advisors: RWTH CON: Yashvi Baria, VIC: Henk van der Laan)
9. Gallium resources worldwide and in Europe (advisors: Catura Geoprojects: Beate Orberger; Mytilineos: Thymis Balomenos)
10. Gallium extraction: where we are, where we go? (advisors: MEAB: Carsten Dittrich, KTH: Kerstin Forsberg; Michael Svärd)
11. Gallium market and market strategies (advisors: VIC: Henk van der Laan, Catura: Beate Orberger, NTUA: Dandai Marinou)
12. Life-Cycle Assessment and Material Flow Analyses of Sc, V, Nb from TiO_2 residues needs and challenges (advisors: ENALOS: Dinos Sakkas, Stavroula Panagiotidou)

Please contact for questions and register until 30th September.

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