



UNIVERSITÉ
DE LORRAINE



Post-Doc position at the University of Lorraine (France)

GeoRessources Laboratory

Title: Flotation of fine-grained low grade oxides ores: physical chemistry and machine aspects modelling

General requirements:

Candidates should have an outstanding research record in the field of Mineral processing with extensive knowledge in physical chemistry, process and/or chemical engineering. The selected candidate will join the “Georessources” research, a major international research center with about 60 academics for a total staff about 180 persons developing research programs in all fields of applied geosciences including, mineral processing, minerals engineering, ore genesis, 3D modeling and economic geology.

The research activity will be in the “Mineral processing” team on fragmentation techniques and flotation of ores. Innovative research on the beneficiation of non-conventional and low-grade resources can be developed. The experiences on the process intensification by coupling with external fields (electric pulses, ultrasonic) will be appreciated.

The candidate will integrate a research group with two senior researcher and 2-3 PhD students and will be involved in experimental research and academic tuition depending on candidate's curricula.

Description of work:

The subject of postdoctoral work is related with major technological challenges to develop techniques for the exploitation of resources with low or very low concentrations of valuable substances. Critical metal ores are characterized by low contents in recoverable metals, extremely fine dissemination of the metal-bearing minerals, and low property contrasts between these phases and the gangues minerals.

The main objective of the work is to achieve understanding and description of the phenomena based on change of surface and structural properties with decreasing particle size. The work ambition is to develop the methodological and scientific approach of the selection of flotation reagent formulations to ensure the selectivity even if the contrast of the separation decreases with decrease of particle size. The problems related with low collision probability in conventional approaches will be solved by applying the new intensive flotation cell available at pilot plant of Geporesources Laboratory.

In the quest for increased separation of the constituent minerals with low reactivity contrasts, the scientific challenges converge towards molecular-scale understanding of the mechanisms of interaction between minerals surface and energy fields and/or flotation reagents.

The work program addresses following aspects of these interactions:

- Surface speciation of non-sulphides minerals (silicates, carbonates, oxides) under normal and energy grinding/conditioning to model the fine particles behavior and stability in concentrated mineral suspensions.
- Development of the method to study the bubble-particle attachment in high turbulent conditions. The role of external forces as ultrasound and/or internal hydrodynamic impacts will be considered as main factors on the changing of bubble-particle attachment/detachment subprocesses for fine particle flotation
- Experimental work, development and/or modelling of flotation in the new intensive flotation cell using principle of a reactor-separator flotation device.

Funding: This Postdoctoral will be funded by the LabEx RESSOURCES21 which was selected by the French Ministry of Research and Education in the framework of the "Laboratoires d'Excellence" initiative. RESSOURCES21 proposes an integrated scientific and educational approach to the understanding, exploitation and environmental management of strategic metal resources for the 21th century.

Provided documents:

- List of publications;
- Experience in field, analytical, experimental or modeling approaches;
- Project in two-three pages summarizing the main trends in research that the candidate would like to develop.

Applicants should send via email a Curriculum Vitae, Provided documents and the names and email addresses of two references to:

Pr Lev FILIPPOV, lev.filippov@univ-lorraine.fr

RESSOURCES21'S contact, ressources21-contact@univ-lorraine.fr

Calendar for applying:

- December 12,2014 : Deadline for submitting your application;
- Beginning of january : Preliminary review, the candidates will be contacting after being preselected;
- For definitive selection, an audition of the candidat will be arranged either in Nancy or by video-conference.

Starting on 2 February 2015, Level of salary: minimum 2000 Euros net / month, depending on the post-doc experience.