THE UNIVERSITY OF BRITISH COLUMBIA
Hydrometallurgy Group

BRIMM
BRADSHAW RESEARCH INITIATIVE FOR MINERALS & MINING

UBC Extractive and Hydrometallurgy Chair

Short courses offered from September 17 – October 29, 2020

Session 1: Processing of arsenic-containing ores: flotation, leaching, and waste stabilization

Organizer: Wenying Liu

Date: Thursday September 17, 2020

Registration: Register Here by September 15

Outline: Operations face increasing challenges of unlocking value in arsenic-bearing copper and gold deposits and responsible disposal of arsenic-containing waste. This short course is designed to help you understand the behavior of arsenic-bearing minerals and the fate of arsenic across all stages of production, from mineral separation, to metal extraction, to ultimate safe disposal. The course will cover: (1) Froth flotation for selective separation of arsenic-bearing minerals; (2) Arsenic removal in hydrometallurgical processing of arsenic-rich copper and gold concentrates/ores; (3) The long-term stability of calcium arsenate, ferric arsenate/scorodite, and arsenic trisulfide in the environment.

Agenda:

Topic	Time	Instructor
Flotation of arsenic-containing ores	8:30 - 9:15 AM	Marek Pawlik
Leaching of arsenic-containing concentrates/ores	9:30 - 10:15 AM	David Dreisinger
Disposal and environmental stabilization	10:30 - 11:15 AM	Wenying Liu

Session 2: Pyrometallurgical processing of copper: smelting, converting, gas injection, and SO_2 processing

Organizer: Leili Tafaghodi

Date: Thursday October 8, 2020

Registration: Register Here by October 6

Outline: Copper production from primary resources is mostly from ores containing Cu–Fe–S minerals and the majority of these ores are treated by smelting. The pyrometallurgical processing of copper has evolved and varies depending on the charge materials, the process and its operating parameters, and the shape and size of the vessel. Plant operations also vary in terms of air/oxygen injection practices. With continuous improvements of the environmental regulations, handling the furnace off-gas which contains SO_2 has become increasingly important. The short courses in pyrometallurgical processing of copper cover: (1) Smelting and converting technologies and the process variations; (2) Gas injection in bath smelting focusing on the development of sonic injection; and (3) Production of SO_2 and sulphuric acid in metallurgical and chemical industries.

Agenda:

Topic	Time	Instructor
Copper making technologies from fundamentals to operations	8:30 - 9:15 AM	Gerardo Alvear
Gas injection in bath smelting and converting	9:30 - 10:15 AM	Joel Kapusta
Production of SO_2 and Sulphuric Acid	10:30 - 11:15 AM	Werner Vorster/ Erin Kwan

Session 3: Leaching process modelling: from laboratory data to design of reactors and heaps

Organizer: David Dixon

Date: Thursday October 22, 2020

Registration: **Register Here** by October 20

Outline: Proper determination of metal extraction kinetics is central to the success of any hydrometallurgical operation. This short course is designed to help you collect data from laboratory leaching tests, develop kinetic models based on the leaching data collected, and apply the models to reactor and heap design. This course will cover: (1) Fundamentals of batch leaching rate laws and design of leaching tests to quantify the effect of thermal and chemical factors on reaction rate; (2) Case studies of chalcocite, pyrite, and chalcopyrite leaching demonstrating how to develop kinetic models using leaching data collected; (3) Statistical leaching reactor models for sizing of leaching reactors.

Agenda:

Topic	Time	Instructor
Fundamentals of sulfide leaching kinetics	8:30 - 9:15 AM	Wenying Liu
Batch Leaching case studies	9:30 - 10:15 AM	David Dixon
Sizing of leaching reactors	10:30 - 11:15 AM	David Dixon

Session 4: Tailings dewatering and management

Organizer: Marek Pawlik

Date: Thursday October 29, 2020

Registration: **Register Here** by October 27

Outline: Tailings dewatering becomes increasingly important given the increased scrutiny and pressure to improve the management of tailings. This short course will cover both fundamental knowledge and the industry perspectives on tailings management. The fundamentals include colloidal stability of tailings, the effect of pH/different parameters on surface charges of particles (clay), and challenges of liquid-solid separation; mechanisms by which polymer flocculants adsorb onto particle surfaces; and how the adsorption of polymers affects particle surface properties, reduction in repulsive forces between clay particles, rheology, and zeta potential measurements. The industry perspective covers various aspects of tailings management in different geotechnical, climate, and social conditions.

Topic	Time	Instructor
Fundamentals on colloidal stability and polymer flocculants	8:30 - 9:15 AM	Marek Pawlik
Fundamentals on solid-liquid separation	9:30 - 10:15 AM	Marek Pawlik
Industry perspectives in tailings management	10:30 - 11:15 AM	Harvey McLeod

Note:

- All sessions are free of charge; a zoom link will be sent to all who registered;
- All sessions will be recorded and made available to the Chair sponsors together with the course materials upon request;
- To know us more, check our group website: http://hydromet.group/team/.