**Wuhan Course Outline**

 DAYS 1-2

**Colloid chemistry in mineral processing**

**Part 1 (Course notes pages 1-31).**

Wettability of solid surfaces. Origin of electrical charge at solid/liquid interface. Electrical double layer. Elektrokinetic potential. Lyophobic dispersions. DLVO theory of stability of lyophobic colloids. Coagulation. Selective coagulation. Electrostatic stabilization and steric stabilization. Classification of polymers utilized in aggregation/stabilization of dispersions. Schulze-Hardy rule of coagulation.

**PDF. Part 2A**. Paper: J.S. Laskowski, Anisotropic minerals in flotation circuits, **CIM Journal**, **Vol. 3,** No. 4, pp. 203-214 (2012).

**PDF. Part 2B**, Paper: A. Merve Genc, I. Kilickaplan and J.S. Laskowski, Effect of pulp rheology on flotation of nickel sulfide ore with fibrous gangue particles, **Can. Metal. Quart**., **51**, 368-375 (2012).

**Part 3. (Course notes pages 32-45)**

Flocculation. Bridging flocculation, steric stabilization. Flocculants. Polyacrylamides, molecular weight,

degree of anionicty. Testing flocculants. Use of flocculants in filtration. Use of flocculants in coal processing.

**Part 4A**. Paper: S. Castro and J.S. Laskowski, The effect of flocculants and their degradation products on molybdenite flotation. **Cobre 2013**, Santiago, Dec. 1-4, 2013.

**PDF. Part 4B**, Paper: Peng Huang, J.S. Laskowski, Hongbo Zeng and Qingye Lu, Use of flocculants in high ionic strength process waters, **Conference of Metallurgists** (COM), Montreal. October 2013.

**DAY 3**

**Effect of electrolyte concentration on flotation**.

**Part 5 - Power Point Presentation**

Effect of electrolyte concentration on flotation of inherently hydrophobic minerals,

salt flotation. Flotation with fatty acids in process water with high concentration of Ca and Mg ions.

Sea water. Flotation of Cu-Mo sulfide ores in sea water.

**Part 6 (Course notes, pages 46-49)**

Flotation of water-soluble minerals. Potash ore flotation.

**PDF, Part 7**. Paper: J.S. Laskowski, From amine molecules adsorption to amine precipitate transport by bubbles: A potash ore flotation mechanism, **Minerals Engineering, 45**, 170-179 (2013).

**DAY 4**

**Fine particles processing**.

**Part 8**. (Course notes, pages 1-29)

Flotation. Separation methods in mineral processing. Liberation. Effect of particle size on flotation.

Entrainment. Frothers. Bubbles coalescence and stability. Testing frothers. Flotation kinetics. Bubble area flux. Froth zone recovery. Flotation machines. Flotation under plug flow and perfectly mixed conditions. Flotation column. Jameson flotation cell. Wash water.