Virtual Curtain Limited

Technical Sheet

Background

The Virtual Curtain technology is based on the in situ formation of hydrotalcites, a Mg-Al sub-class of layered double hydroxide minerals. Hydrotalcites are unique in that they may incorporate both cations (positively charged) and anions (negatively charged) simultaneously into their structure. The Virtual Curtain technology is unique in that it can actively incorporate a range of contaminants into its structure, generally in a single step. An example of the elements that may readily be incorporated into hydrotalcites is shown in Figure 1.

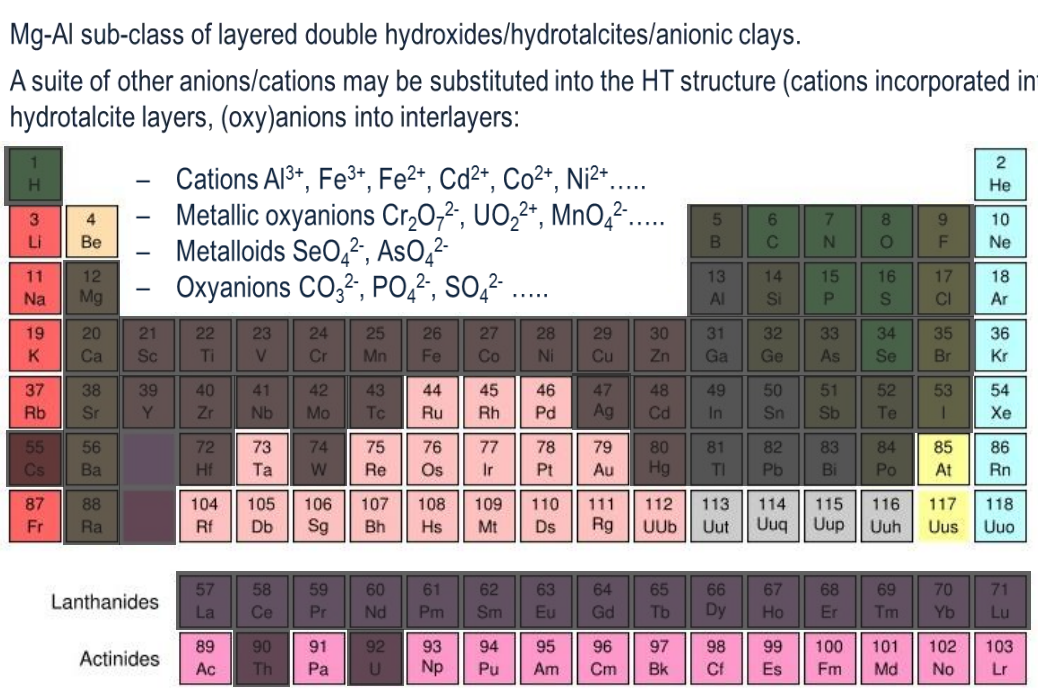

Figure 1. Range of elements able to be removed via in situ hydrotalcite formation

Advantages of the Virtual Curtain technology

Compared to other technologies for the removal of contaminants from wastewaters, the Virtual Curtain technology possesses a number of technical and operational advantages:

- Generally single step formation of hydrotalcite.
- Simultaneously removes a broad spectrum of contaminants including heavy metals, metalloids and radionuclides.
- Rapid reaction with the majority of water available immediately.
- Low infrastructure/capital costs.
- May be applied in low to high pH and fresh to hypersaline waters.
- Sludge volumes reduced by up to 90% compared to lime.
- High contaminants concentration factor (typically 200-500 times) with prospect to form an “ore” and reprocess to offset treatment costs.
- Low life-cycle costs.
- Suited to both in situ and pump and treat operations.
- Ideal pre-treatment for reverse osmosis.

Technical specifications

Hydrotalcite is formed in-situ in wastewaters via the:

- Addition of one or more soluble Mg and/or Al-containing inorganic salts and soluble alkali to tailor the water composition to that appropriate for hydrotalcite formation.
- Initial pH for formation is generally 10.0 to 10.5 but can be rapidly lowered to ca. 8.5 via air sparging.
- Once formed, hydrotalcite rapidly settle (ca. 10m/day in a static/unmixed system) or may be removed by centrifugation or sand filtration.

An image of hydrotalcites formed from the neutralisation of an acidic uranium mine wastewater are shown in Figure 2. These precipitates contain approximately 1% U and 2.5% rare earth elements.

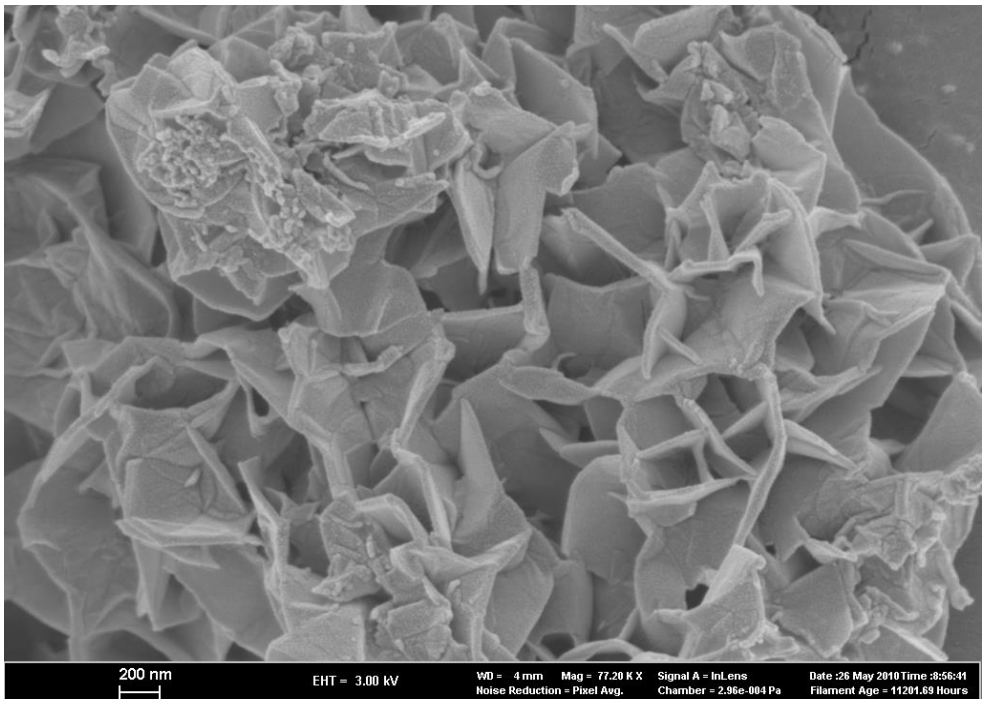

Figure 2. Scanning Electron Microscope image of hydrotalcites formed in situ from a uranium mine wastewater. Scale bar is 200 nm.