

GOLD CYANIDE EXTRACTION BY COLLOIDAL SYSTEMS

Jasmine Quah

*Fairmount College of Liberal Arts & Sciences
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Abstract: Gold cyanide, $[\text{Au}(\text{CN})_2]^-$, is a compound formed during the gold mining process as the cyanidation of gold solubilizes the metal for reclamation. The cyanide used in this process is harmful for the surrounding environment as well as being harmful for humans; therefore, much research has been done on alternatives to the cyanide reactant as well as the methodology itself. The harmful effects of gold cyanide plants could be reduced with an alternative reclamation process that captures both gold cyanide complexes and remaining cyanide in solution. Because gold 17 cyanide and cyanide are negatively charged, both should associate with positively charged vesicles in a colloidal state. By mixing a metal slurry with a solution positively charged vesicles, the gold cyanide complex associates with the spherical bilayer of surfactants allowing for centrifugation and extraction of gold from the mixture. Similarly, the not complexed cyanide in solution should associate with the vesicles of which can be filtered out of solution with a spin column. The concentration of gold remaining in the supernatant and the concentration of nitrogen extracted with the vesicles can then be measured with inductively coupled plasma (ICP) analysis. The intensity results from the ICP analysis should then correlate to the relative concentrations of gold and nitrogen extracted from the original metal slurry.

Faculty Mentor: *Doug English*