

**Control of Surface Chemistry of
Gold, Pyrite and Pyrrhotite**

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(ABSTRACT)

Removing pyrite from coal and pyrrhotite from pentlandite play a critical role in coal and nickel production, respectively, to meet the stringent restriction on SO₂ emission. The present project investigates first the mechanism of xanthate adsorption on gold using Atomic Force Microscope (AFM), then the depression of pyrite and pyrrhotite using the synthetic polymers developed by Cytec Industries. The results show that for xanthate/gold system, dixanthogen is the only species that renders the surface hydrophobic. Chemisorbed xanthate is observed on the gold surface but is hydrophilic. The synthetic polymers may adsorb on pyrite and pyrrhotite possibly through the hydrophobic interaction between the hydrophobic moiety of the polymer and the mineral surface that has been hydrophobized by collector adsorption. The hydrophilic moieties of the polymer are exposed to the aqueous phase and render the surface hydrophilic.

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