

柴山研究室(客員教授)

[レアメタルリサイクルと都市型廃棄物からの金属回収]

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専門分野 : 資源処理工学・資源利用技術・リサイクル
Mineral processing and Recycling Engineering

テーマ1: 貴金属を含む廃液からの金属回収

Metals recovery from effluent water containing precious metals

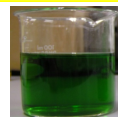
高品位貴金属含有スクラップ



リサイクル工程

貴金属製品
金, 銀, 白金など

廃液が発生



廃液の組成
Cu: 4,000mg/L
In: 1,400mg/L
Ni: 500mg/L
Pd: 18mg/L

研究目的

- ・廃液からの金属回収法の検討
- ・各処理法の最適条件の検討

1段金属回収プロセス

2段金属回収プロセス

(セメンテーション+中和沈殿法)

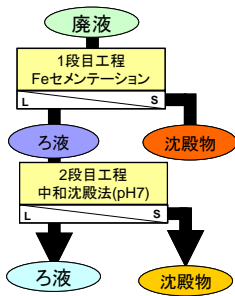
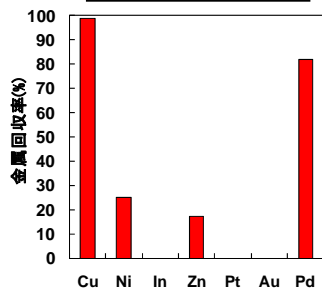
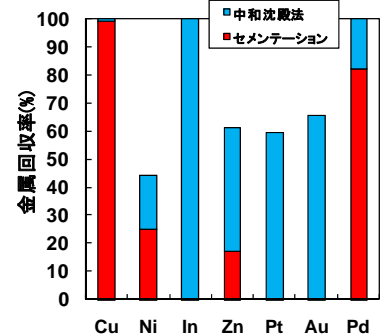
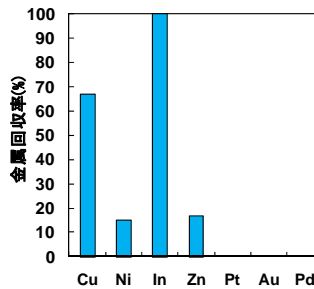


図 実験フロー

セメンテーション結果



中和沈殿法結果

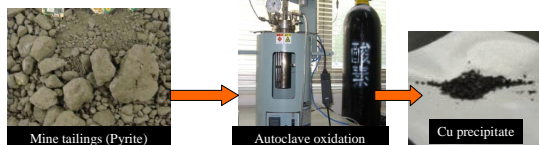


テーマ2: 都市型廃棄物からの金属回収

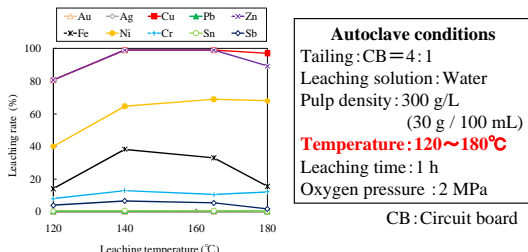
Recovery of metals from electronic waste and municipal solid waste

Recovery of metals from electronic wastes

E-wastes contain many valuable metals that need to be recovered for re-use by society. In this study, we try to develop a method by which e-waste can be dissolved in an autoclave by mixing with sulfide bearing mine tailings under oxygen atmosphere. The dissolved metals can be recovered by precipitation and cementation methods.

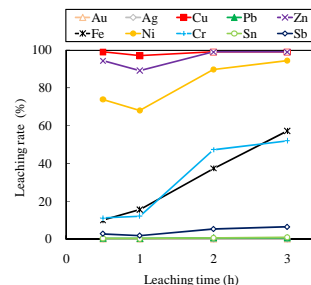


Effect of temperature



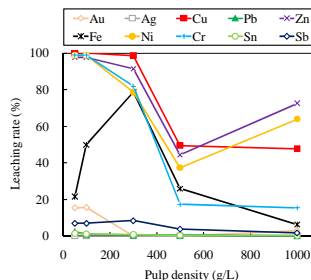
Autoclave conditions
Tailing: CB=4:1
Leaching solution: Water
Pulp density: 300 g/L (30 g / 100 mL)
Temperature: 120~180°C
Leaching time: 1 h
Oxygen pressure : 2 MPa
CB: Circuit board

Effect of leaching time



Autoclave conditions
Tailing: CB=4:1
Leaching solution: Water
Pulp density: 300 g/L (30 g / 100 mL)
Temperature: 180°C
Leaching time: 0.5 - 3 h
Oxygen pressure : 2 MPa

Effect of pulp density



Autoclave conditions
Tailing: CB=4:1
Leaching solution: Water
Pulp density: 50 - 1000 g/L (5 - 100 g / 100 mL)
Temperature: 180°C
Leaching time: 2 h
Oxygen pressure : 2 MPa