

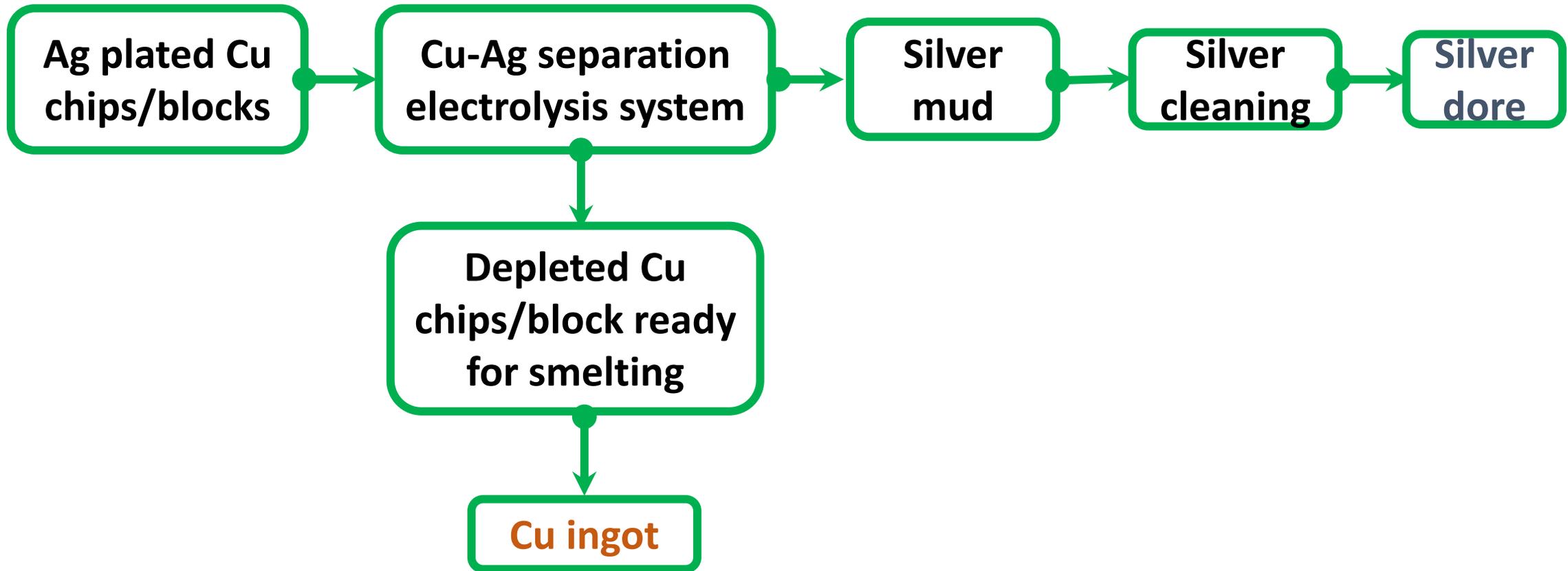
Silver recovery through Electrolysis process

Eco-Goldex Inc.

Equipment, Agents used in the process

- Eco-Goldex E series agent (powder)
- Eco-Goldex electrolysis system
- Vacuum filtering system
- NaCl (salt), Nitric Acid, sulfuric acid
- Zinc/iron powder or glucose powder
- Induction furnace (smelting)

Cu-Ag recovery system flowsheet





**Integrated
lab scale
electrolysis
system**



**Stand-alone
electrolysis
system**



**Large scale
electrolysis
system**

Silver Mud Processes

1. Collecting electrolytic silver mud from cathode.
2. Rinse the mud with clean water several times and then filter to retain the solid mud;
3. Transfer the mud into a beaker, place the beaker under a ventilation hood, and add diluted HNO₃ (40%) into the beaker while stirring the solution till solid mud is completely dissolved;
4. Upon completed dissolve of the mud in nitric acid solution, add enough fresh water to dilute the acid. Filter solution and retain the clean solution in a clean beaker;
5. Dissolve uniodized table salt in a beaker and make sure the salt solution is saturated with salt(salt can't be dissolved anymore).
6. Slowly add the salt solution into the clean AgNO₃ solution beaker. Stirring vigilantly to make sure the solution is completely mixing. White deposits (AgCl) should be formed and deposited to the bottom of the beaker.
7. Let the solution settle down several hours or over night.
8. Filter the silver chloride sediment and retain the solid mud;
9. Rinse the solid mud with water till it is neutral

Convert AgCl to Ag with Zn/Fe reduction:

- Transfer AgCl into a beaker; if it is dry, add some fresh water to make AgCl slurry;
- Add Zinc (or iron) powder into the slurry. If the reduction reaction doesn't start, add a little bit sulfuric acid to ignite the process.



- It takes 65 grams of Zinc to convert 287 grams AgCl. Roughly by weight ratio :
Zn : AgCl = 1 : 4.4; if Fe is used, then the weight ratio of Fe: AgCl = 1: 5.
- The reduction process should be completed in 4 hours. Then add enough sulfuric acid to dissolve extra Zn (Fe);
- Add water to dilute the solution and then filtering till solution is neutral .
- Glucose powder (solution) can be used to replace zinc/Iron for the reduction process.
- Transfer the solid Ag mud to a slot for smelting.
- Smelting the Ag mud to produce Silver Dore (99% purity silver or better).