

Platinum and Palladium Separation Method

Referenced from:

"Recovery and Refining of Precious Metals" by C. W. Ammen

Procedure

Boil the aqua regia solution containing the Pt and Pd down to a syrup like consistency, add hydrochloric acid and repeat until the solution is completely free of nitric acid. Do this under a hood at a medium heat not letting the liquid evaporate entirely. Then, pour into a large vessel; wash the evaporating dish with a wash bottle. Dilute the solution with three or four volumes of tap water then filter.

The reagent used to precipitate the platinum is ammonium chloride. This will also bring down any iridium present. Use good quality ammonium chloride. You need an amount of ammonium chloride at least half the weight of the platinum values that are in the solution. A little excess is recommended. You will need a concentrated ammonium chloride solution of about 4 N. (214 grams in 1 liter).

Have the solution warm to medium heat. Pour the ammonium chloride in slowly while stirring and you will see the orange-yellow precipitate form. This is the platinum. If iridium is present, it will precipitate out as a black solid more slowly starting in about one hour. So separation is possible.

After gold (use sulfur dioxide gas), platinum and iridium removal, the palladium can be removed. It is precipitated with sodium or potassium chlorate. Sodium chlorate works better but it can be dangerous because if it comes in contact with organic material, it can cause a fire.

Put the solution in a beaker and bring it to a light boil. Then lower the heat to just below boiling. CAREFULLY, put a teaspoon of sodium chlorate crystals over the beaker and carefully shake a few crystals into the solution at a time. The solution will agitate. When it calms down carefully add in a few crystals more just so the solution does not boil over. You will need about a teaspoon of sodium chlorate for every quart of solution depending on how much Pd is present. The precipitate of palladium is a bright red powder, palladium ammonium chloride.

Use as little sodium chlorate as possible. The fumes produced are chlorine gas so do this in a hood.