Notes: Using Solubility Rules to Find the Percent of Silver in a Silver Quarter

The old silver quarters were made of silver, true, but there was also a significant amount c copper in them as well (a solution of metals like this is called an alloy). Let's say you had t know how much of the quarter was silver and how much was copper.

1) Weigh a piece of a quarter (you're not given the whole thing): .3285 g alloy

2) Dissolve the quarter in 6M nitric acid, which dissolves both silver and copper.

3) You'll want to use a source of chlorine to separate the two metals because silver chlorid is a solid whereas copper chloride is soluble.

a) sodium chloride is easy. How much should you use? Pretend the coin was pure silver and calculate the amount NaCl needed: (A: 0.1780 g NaCl)

b) Double that amount to be on the safe side: 2 x 0.1780 = 0.3560 g NaCl

4) Add the sodium chloride to the dissolved piece of quarter. A preciptate will form. What ions are now in the beaker?

5) Weigh a piece of filter paper. Run the contents of your beaker through that filter paper, washing the solid with lots of distilled water to get those extra ions away from the precipitate. Then dry off the filter paper (overnight or in an oven).

Mass of filter paper: 2.8342 g

Filter paper + AgCl: 3.2275

just AgCl: .3933 g

Find the mass of the Ag in the alloy (A: 0.2959g)

Mass percent of the silver in the alloy: (A: 90.08%)