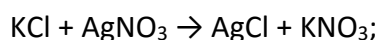
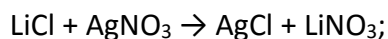


## Answer on Question #73417 - Chemistry - General Chemistry

Question:

A mixture consisting of only lithium chloride (LiCl, 42.391 g/mol) and potassium chloride (KCl, 74.55 g/mol) weighs 1.7695 g. When the mixture is dissolved in water and an excess of silver nitrate is added, all the chloride ions associated with the original mixture are precipitated as insoluble silver chloride (AgCl, 143.32 g/mol). The mass of the silver chloride is found to be 5.3686 g. Calculate the mass percentage of lithium chloride in the original mixture.

**Solution:**



Let the mass LiCl = x gram, then the mass KCl = (1.7695 – x) grams;

$$n(\text{LiCl}) = m/M = x/42.391 \text{ mol};$$

$$n(\text{KCl}) = m/M = (1.7695 - x)/74.55 \text{ mol};$$

$$n(\text{AgCl}_{(1)}) = x/42.391 \text{ mol};$$

$$n(\text{AgCl}_{(2)}) = (1.7695 - x)/74.55 \text{ mol};$$

$$n(\text{AgCl}_{(1)}) * M(\text{AgCl}) + n(\text{AgCl}_{(2)}) * M(\text{AgCl}) = m(\text{AgCl})$$

$$(x/42.391 \text{ mol} * 143.32) + ((1.7695 - x)/74.55 \text{ mol} * 143.32) = 5.3686;$$

$$3.38 * x + ((1.7695 - x) * 1.92) = 5.3686;$$

$$3.38 * x + 3.40 - 1.92 * x = 5.3686;$$

$$1.46 * x = 1.9686$$

$$x = 1.3484 \text{ g.}$$

So m (LiCl) = 1.3484 g, then the m (KCl) = 1.7695 – 1.3484 = 0.4211 g.

The mass percentage of lithium chloride in the original mixture:

$$\chi(\text{LiCl}) = m(\text{LiCl})/m(\text{mixture}) = 1.3484/1.7695 = 0.762 = 76.2 \text{ \%}.$$

**Answer:** 76.2 %.