Answer on Question #56297 - Chemistry - General chemistry

Question:

Part 1: Using the following reaction: Aqueous lead (II) nitrate reacts with aqueous lithium sulfate.
A) predict the products
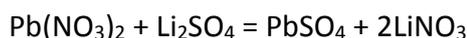B) write all formulas
C) balance the reaction

Part 2:
A) given 100.0 grams of lead (II) nitrate and excess lithium sulfate, calculate the amount (in grams) of lithium nitrate produced.

B) given 100.0 grams lead (II) nitrate and 100.0 grams lithium sulfate, calculate the amount (in grams) of lead (II) sulfate produced.

Solution

Part 1

$$Pb(NO_3)_2 + Li_2SO_4 = PbSO_4 + 2LiNO_3$$

Part 2

$M(Pb(NO_3)_2) = 207 + 14*2 + 16*3*2 = 331$ (g/mol)

$M(Li_2SO_4) = 2*7 + 32 + 16*4 = 110$ (g/mol)

$M(LiNO_3) = 7 + 14 + 16*3 = 69$ (g/mol)

$M(PbSO_4) = 207 + 32 + 16*4 = 303$ (g/mol)

A) $n(Pb(NO_3)_2) = m/M = 100/331 = 0.302$ (mol)
   $n(LiNO_3) = n(Pb(NO_3)_2) * 2 = 0.604$ (mol)
   $m(LiNO_3) = n*M = 0.604 * 69 = 41.68$ (g)
B) $n(Pb(NO_3)_2) = m/M = 100/331 = 0.302$ (mol)
   $n(Li_2SO_4) = m/M = 100/110 = 0.909$ (mol) – excess
   $n(PbSO_4) = n(Pb(NO_3)_2) = 0.302$ (mol)
   $m(PbSO_4) = n*M = 0.302 * 303 = 91.51$ (g)