Answer on Question #63273 - Chemistry – General Chemistry

Chapter 3 (3.82)

Solutions of sulfuric acid and lead(II) acetate react to form solid lead(II) sulfate and a solution of acetic acid.5.90 g of sulfuric acid and 5.90 g of lead(II) acetate are mixed.

1)Calculate the number of grams of lead(II) acetate present in the mixture after the reaction is complete.

2)Calculate the number of grams of acetic acid present in the mixture after the reaction is complete.

Solution.

$H_2SO_4 + Pb(CH_3COO)_2 \rightarrow PbSO_4\downarrow + 2CH_3COOH$
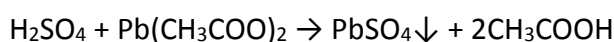
$M(H_2SO_4) = 2 + 32 + 64 = 98$ g/mol; $M(Pb(CH_3COO)_2) = 207 + (12 + 3 + 12 + 32)\times2 = 325$ g/mol
$\nu(H_2SO_4) = m/M = 5.9/98 = 0.060$ mol
$\nu(Pb(CH_3COO)_2) = m/M = 5.9/98 = 0.018$ mol
$\nu(H_2SO_4) > \nu(Pb(CH_3COO)_2)$
   1) $m(Pb(CH_3COO)_2) = 0$ g
   2) $\nu(H_2SO_4) = 0.060 - 0.018 = 0.042$ mol
      $m(H_2SO_4) = \nu\times M = 0.042\times98 = 4.1$ g

      Answer: $m(Pb(CH_3COO)_2) = 0$ g;
               $m(H_2SO_4) = 4.1$ g