Answer on Question #40468 - Chemistry - Other

Question

For the following chemical reaction, how many moles of lead (II) iodide will be produced from 136 g of potassium iodide?

$2KI + Pb(NO_3)_2 \rightarrow PbI_2 + 2KNO_3$

Answer:

Number of moles equals:

$$n = \frac{m}{M}$$

m – Mass of KI, m = 136 g.

M – Molar mass of KI, equals:

$$M = M(K) + M(I) = 39.1 + 126.9 = 166.0 \frac{g}{mole}$$

Then number of moles in 136 g of KI equals:

$$n = \frac{136}{166} = 0.819\ mol$$

According to the reaction:

2 mol of KI produces 1 mol of PbI_2 (lead (II) iodide)

0.819 mol of KI – *x* moles of PbI_2

So, the number of moles of lead (II) iodide produced from 136 g of potassium iodide equals:

$$x = \frac{0.819 \cdot 1}{2} = 0.41\ mol$$

Answer: $n(PbI_2) = 0.41$ mol.