Answer on Question #52447 - Chemistry – Inorganic Chemistry

Question

Predict the mass of hydrogen gas produced when 2.73 g of aluminum reacts in a single replacement reaction with excess sulphuric acid.

$2Al + 3H_2SO_4 \rightarrow 3H_2 + Al_2(SO_4)_3$

Answer:

Molar mass of Al is 27.3 g/mol. Molar mass of H_2 is 2 g/mol.

Number of moles of aluminum is:

$$n(Al) = \frac{m(Al)}{M(Al)} = \frac{2.73}{27.3} = 0.1\ mol$$

Make a proportion:

2 mol of Al produce 3 mol of H_2

0.1 mol of Al – *x* g of H_2

$$x = \frac{0.1 \cdot 3}{2} = 0.15\ mol$$

Tha mass of hydrogen gas produced is:

$$m(H_2) = n(H_2) \cdot M(H_2) = 0.15 \cdot 2 = 0.3\ g$$

Answer: $m(H_2) = 0.3$ g