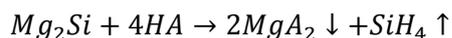


Answer on Question #45803, Chemistry, Inorganic Chemistry



$$n(Mg_2Si) = \frac{m(Mg_2Si)}{M(Mg_2Si)} = \frac{16.05}{76.666} = 0.209mol$$

According to reaction equation, $n(MgA_2) = 2n(Mg_2Si) = 0.418mol$. Molar mass of magnesium halogenide is:

$$M(MgA_2) = \frac{m(MgA_2)}{n(MgA_2)} = \frac{39.85}{0.418} = 95.33g/mol$$

$$M(A) = \frac{M(MgA_2) - M(Mg)}{2} = \frac{95.33 - 24.305}{2} = 35.5g/mol$$

Therefore, halogen is Chlorine.

According to law of conservation of mass :

$$m(Mg_2Si) + m(HCl) = m(MgCl_2) + m(SiH_4);$$

According to reaction equation, $n(HCl) = 4n(Mg_2Si) = 0.836mol$.

$$m(HCl) = 0.836mol * 36.5 g/mol = 30.514g$$

$$m(SiH_4) = m(HCl) + m(Mg_2Si) - m(MgCl_2) = 16.05 + 30.514 - 39.85 = 6.714 g$$

$$n(SiH_4) = \frac{m(SiH_4)}{M(SiH_4)} = \frac{6.714}{32.086} = 0.209mol$$

$$n(Mg_2Si) = n(SiH_4)$$

So, gaseous product is silane