Answer on Question #53099 – Chemistry – Inorganic Chemistry

Task

A mixture contains ethene and ethyne gave 30L of CO_2 consuming 50L of O_2 under similar conditions of temperature and pressure. The total volume of the mixture in litres is

a)5
b)10
c) 15
d)20

Solution

Data

V (CO_2) = 30 L	$C_2H_4 + 3\ O_2 = 2\ CO_2 + 2\ H_2$
V (O_2) = 50 L	$2\ C_2H_2 + 5\ O_2 = 4\ CO_2 + 2\ H_2$
V (C_2H_4 and C_2H_2) = ?	

According to Law of combining volumes and chemical reactions there is further proportions of gases volumes:

$$\frac{V\ (C_2H_4)}{V(CO_2)} = \frac{1}{2}$$

$$\frac{V\ (C_2H_2)}{V\ (CO_2)} = \frac{2}{4}$$

Three volumes of gases are equal to six volumes of carbon dioxide:

$$\frac{3\ V\ (mixture\ of\ gases)}{6\ V\ (CO_2)} = \frac{1}{2}$$

If V (CO_2) = 30 L

then V (mixture of gases) = $\frac{V\ (CO_2)}{2} = \frac{30\ L}{2} = 15\ L.$

Answer: V (C_2H_4 and C_2H_2) = 15 L (c)