Answer on Question #52445 - Chemistry – Inorganic Chemistry

Question

Iron metal is produced in a blast furnace by the reaction of iron (III) oxide and coke (pure carbon). If 25.0 moles of pure Fe_2O_3 is used, how many grams of iron can be produced? The balanced chemical equation for the reaction is:

$Fe_2O_3 + 3C \rightarrow 2Fe + 3CO$

Answer:

According to the reaction equation:

1 mol of Fe_2O_3 produces 2 mol of Fe

25.0 mol of Fe_2O_3 – *x* mol of Fe

$$x = \frac{25.0 \cdot 2}{1} = 50.0\ mol$$

Tha mass of iron that can be produced is:

$$m(Fe) = n(Fe) \cdot M(Fe) = 50.0 \cdot 55.8 = 2790\ g$$

Answer: m(Fe) = 2790 g