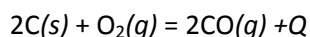


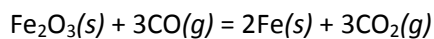
Iron metal is produced in a blast furnace by the reaction of iron (III) oxide and coke (pure carbon). If 25.0 moles of pure Fe_2O_3 is used, how many grams of iron can be produced? The balanced chemical equation for the reaction is:

Solution:

This reaction might be divided into multiple steps, with the first being that preheated blast air blown into the furnace reacts with the carbon in the form of coke to produce carbon monoxide and heat:



The hot carbon monoxide is the reducing agent for the iron ore and reacts with the iron oxide to produce molten iron and carbon dioxide:



From 1 mole Fe_2O_3 produced 2 mole Fe

From 25.0 moles Fe_2O_3 produced $2 \times 25.0 = 50.0$ moles Fe.

$$m(\text{Fe}) = \text{Ar}(\text{Fe}) \times n(\text{Fe}) = 55.8 \times 50.0 = 2790 \text{ g.}$$

Answer: $m(\text{Fe}) = 2790 \text{ g.}$