

The background features a repeating pattern of large triangles. Each triangle is composed of a smaller solid-colored triangle (either blue or orange) with a white border, set against a white background. The triangles are arranged in a staggered, overlapping fashion.

LIMITING REACTANTS

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Finding Limiting Reactants

- ▶ Given 167 g of Fe_2O_3 reacts with 85.8 g of CO and the balanced equation is shown below

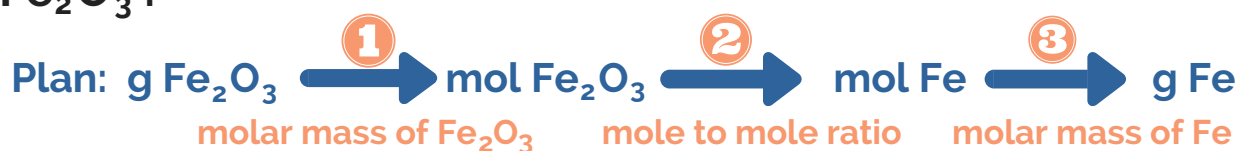


a) Find the limiting reactant

Step 1: Convert grams of each reactant to grams of product

- Note: It doesn't matter which product you choose either Fe or CO_2 you will get the same answer. Some questions will ask for a specific product, but this question does not. We will choose Fe for this example.

Fe_2O_3 :



1 molar mass of Fe_2O_3
Fe = $55.85 \times 2 = 111.7$
O = $16 \times 3 = 48$
Add masses together
 $111.7 + 48 = 159.7 \text{ g/mol}$

2 mole to mole ratio $\frac{2 \text{ mol Fe}}{1 \text{ mol Fe}_2\text{O}_3}$
Numbers/Coefficients From balanced equation
 $1 \text{ Fe}_2\text{O}_3 (\text{s}) + 3 \text{CO}(\text{g}) \longrightarrow 2 \text{Fe} (\text{s}) + 3 \text{CO}_2 (\text{g})$

3 molar mass of Fe
Fe = 55.85 g/mol
(From the periodic table)

Setup:

$$167 \text{ g Fe}_2\text{O}_3 \times \frac{1 \text{ mol Fe}_2\text{O}_3}{159.7 \text{ g Fe}_2\text{O}_3} \times \frac{2 \text{ mol Fe}}{1 \text{ mol Fe}_2\text{O}_3} \times \frac{55.85 \text{ g Fe}}{1 \text{ mol Fe}} = 116.8 \text{ g Fe}$$

Let's do this same process for the second reactant CO.