Answer on Question #63080 - Chemistry - General Chemistry

Question:

Iron(III) oxide reacts with carbon monoxide to produce iron and carbon dioxide. $Fe_2O_3(s)+3CO(g)\rightarrow 2Fe(s)+3CO_2(g)$
What is the percent yield of iron if the reaction of 63.4 g of iron(III) oxide produces 15.0 g of iron?

Solution:

We can see from reaction equation that 1 mole of iron oxide yields 2 moles of iron.
Molar mass of iron oxide is 2*55.85 + 3*16.00 = 159.7 g/mol; of iron – 55.85 g/mol.
So 159.7 g of iron oxide give 111.7 g of iron.
Than 63.4 g of iron oxide theoretically should produce 63.4g * 111.7g / 159.7g = 44.3 g of iron.

Percent yield is (actual mass of product / theoretical mass of product) * 100% = (15.0g/44.3g)*100% = 33.9 %.

Answer:
The percent yield of iron in the reaction is **33.9%**