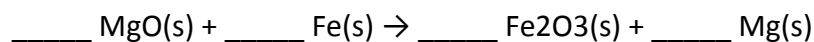


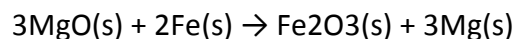
## Answer on the question #54716 – Chemistry – General chemistry

### Question:

Balance the chemical equation given below, and determine the number of grams of MgO are needed to produce 20.0 g of Fe<sub>2</sub>O<sub>3</sub>.



### Answer:



According to the equation, the number of the moles of MgO and Fe<sub>2</sub>O<sub>3</sub> relate as 3/1:

$$\frac{n(\text{MgO})}{3} = n(\text{Fe}_2\text{O}_3)$$

The number of grams is proportional to the number of moles with the factor of molar mass:

$$\frac{m(\text{MgO})}{M(\text{MgO})} = n(\text{MgO}), \quad \frac{m(\text{Fe}_2\text{O}_3)}{M(\text{Fe}_2\text{O}_3)} = n(\text{Fe}_2\text{O}_3).$$

Molar mass of MgO is 40.3044 g/mol, molar mass of Fe<sub>2</sub>O<sub>3</sub> is 159.69 g/mol. Then, we can derive the expression for the mass of MgO:

$$m(\text{MgO}) = n(\text{MgO}) * M(\text{MgO}) = n(\text{Fe}_2\text{O}_3) * M(\text{MgO}) * 3 = \frac{m(\text{Fe}_2\text{O}_3)}{M(\text{Fe}_2\text{O}_3)} * M(\text{MgO}) * 3$$

$$m(\text{MgO}) = \frac{20.0}{159.69} * 40.3044 * 3 = 15.14 \text{ g}$$