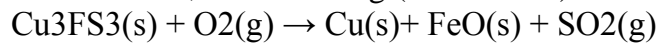


Bornite ( $\text{Cu}_3\text{FeS}_3$ ) is a copper ore used in the production of copper.

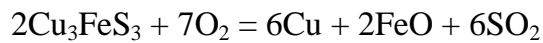
When heated, the following (unbalanced) reaction occurs:



If 2.50 kg of bornite is reacted with excess  $\text{O}_2$  and the process has an 82.5% yield of copper, how much copper is produced (in kg)?

### Answer

The full equation of bornite heating is the following:



$$n(\text{Cu}_3\text{FeS}_3) = (2,5 \cdot 10^3 \text{ g}) / (64 \cdot 3 + 56 + 3 \cdot 32) \text{ g} \cdot \text{mol}^{-1} = 7,27 \text{ mol}$$

$$n(\text{Cu}) : n(\text{Cu}_3\text{FeS}_3) = 2 : 6 = 1 : 3$$

$$m(\text{Cu}) = 7,27 \text{ mol} \cdot 3 \cdot 0,825 \cdot 64 \text{ g} \cdot \text{mol}^{-1} = 1151,6 \text{ g} = 1,15 \text{ kg}$$