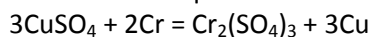


Task:

how many grams of chromium are needed to react with an excess of CuSO₄ to produce 27 g Cu

Solution:

The chemical equation for this reaction is:



The amount of Cu produced in reaction is

$$n(\text{mol}) = m(\text{g}) / \text{MW}(\text{g/mol})$$

$$n(\text{Cu}) = 27 / 63.5 = 0.425 \text{ mol}$$

According to the chemical equation

$$n(\text{Cr}) = \frac{2}{3} \cdot n(\text{Cu})$$

$$n(\text{Cr}) = \frac{2}{3} \cdot 0.425 = 0.283 \text{ mol}$$

The mass of Cr is

$$m(\text{g}) = n(\text{mol}) \cdot \text{MW}(\text{g/mol})$$

The molar weight of Cr is equal to its atomic weight in the periodic table of elements (MW(Cr) = 52 g/mol)

$$m(\text{Cr}) = 0.283 \cdot 52 = 14.7 \text{ g}$$

Answer: $m(\text{Cr}) = 14.7 \text{ g}$