

Cement production



6% of the world's CO_2 comes from cement factories.

Assuming 840 million tons of CO_2 gas are emitted each year from cement factories, what mass of CaCO_3 is consumed to make cement?



Assuming 840 million tons of CO₂ gas are emitted
Each year from cement factories, what mass of
CaCO₃ is consumed to make cement?



Solution: Step 1. The stoichiometry is easy here.
It is 1:1. So we can get the number of moles of CO₂,

$$n_{\text{CO}_2} = \frac{840 \times 10^{12} \text{ grams}}{44 \text{ grams/mole}}$$

which is 1.9×10^{13} moles.

Assuming 840 million tons of CO₂ gas are emitted each year from cement factories, what mass of CaCO₃ is consumed to make cement?



Solution: Step 1. The stoichiometry is easy here. It is 1:1. So we can get the number of moles of CO₂.

$$n_{\text{CO}_2} = \frac{840 \times 10^{12} \text{ grams}}{44 \text{ grams/mole}}$$

Step 2. Now we calculate the mass of CaCO₃.

$$m_{\text{CaCO}_3} = (1.9 \times 10^{13} \text{ moles})(100 \text{ grams/mol})$$

The answer is 1.9×10^{15} grams or 1.9 billion tons.