Answer to Question #62491, Chemistry / Physical Chemistry

How much of 80% pure $CaCO_3$ will be required to produce 48.8 litres of carbon dioxide at STP?
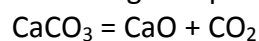
Answer:
1 mole of a gas at Standard Temperature and Pressure (STP) takes V=22.4 L.
So:

$$n = \frac{V}{V_m} = \frac{48.8\ L}{22.4\ L} = 2.18\ mol$$

According to equation
$CaCO_3$ = CaO + CO_2

$$n(CaCO_3) = n(CO_2) = 2.18\ mol$$
$$m = \frac{2.18\ mol\ \times 100.087\ g/mol}{0.8} = \textcolor{red}{\boldsymbol{272.6\ g}}$$