De reactie tussen calciumcarbonaat (CaCO3, molaire massa 100) en gasvormig waterstofchloride (HCl) levert de volgende producten op: vast calciumchloride (CaCl2), gasvormig koolstofdioxide (CO2), en vloeibaar water (H2O). Hoeveel mL CO2 ontstaat, wanneer 20 g CaCO3 reageert met 20 mL HCl bij 1 atm en 25°C?

 A. 4500 mL

 B. 450 mL

 C. 10 mL

 D. 5,0 mL

**Answer: C**

CaCO3(s) + 2HCl(g) ‡ CaCl2(s) + CO2(g) + H2O(l) 20 g CaCO3 = 0.20 mole HCl = 0.00090 mole.

Then HCl is the limiting agent. We will expect (0.00090/2) mole of CO2 produced. That will be the 10 mL. The limiting reagent is the reactant that is completely used up during the chemical reaction. The reactant that is in excess is the reactant that is not completely used up during the chemical reaction, that is, there is some of this reactant left over.