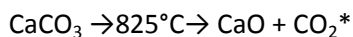


Question #39089, Chemistry, Organic Chemistry

Question

Thermal decomposition of calcium carbonate.

In general, we heat CaCO_3 to temperature of approximately 825°C it decomposes into calcium oxide and liberates carbon dioxide gas:*



Is it possible to heat the calcium carbonate at temperatures below 825 degrees Celsius.

Answer

The decomposition of calcium carbonate is an equilibrium process. The pressure of CO_2 when equilibrium is established is defined only by temperature and some thermodynamic parameters of the reaction. The higher the temperature, the higher the CO_2 pressure. 825°C is a point at which CO_2 equilibrium pressure is almost equal to atmospheric, and CaCO_3 decomposes rapidly. To make it decompose at lower temperatures we need to shift the equilibrium either by pumping out the released CO_2 or by "washing" the system with constant gas flow. Constant removal of CO_2 will make the system trying to release more CO_2 to achieve the equilibrium, and the decomposition rate will increase.