

Answer on Question#37712-Chemistry-Organic Chemistry

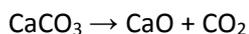
Question

How can we remove stearic acid coating from calcium carbonate powder?

Answer

Two alternatives may be suggested: dry (1) and wet (2), or energy-consuming (1) and energy-saving (2).

1) The easiest way is to place the powder into a furnace heated to the temperature less than 600°C (e.g. 500°C) and keep it there for about 3 hours. Under such temperature stearic acid will oxidized by atmospheric oxygen to CO₂ and H₂O, which leave the powder as gases. Higher temperature should not be used, because under higher temperature calcium carbonate decomposes by following reaction:



Decomposition may partially occur even under lower temperatures, that is why some losses are possible.

2) Since stearic acid is soluble in some organic solvents and calcium carbonate is not, the acid coating may be removed by treatment of the powder with a solvent. Stearic acid is best soluble in 1-propanol (0.877 mol/L). 1-butanol (0.607 mol/L) and trichloroethylene (0.445 mol/L) may also be used.

The procedure of the stearic acid coating removal is as follows:

- 1) add excess of propanol-1 to the powder,
- 2) keep under intensive stirring for an hour (or more),
- 3) filter the powder out (best using vacuum filtration),
- 4) wash the powder with water several times to remove 1-propanol residues,
- 5) dry the powder.