439d CO2 Sorbents Made by Flame Spray Pyrolysis and High Temperature Calcination

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Calcium oxides synthesized by flame spray pyrolysis and high temperature calcination were used as sorbents of carbon dioxide. Flame made sorbents are solid nanoparticles with specific surface areas in the range of 30 to 80 m^2/g. Sorbents by direct calcination of precursors (such as calcium acetate monohydrate) exhibited meso-macro porous structures exhibiting at the same time less surface area (< $30m^2/g$). Thermogravimetric analysis was carried out during CO_2 sorption at various temperatures. At temperatures below 500°C, flame made sorbents showed better performance since the reaction rates are mainly controlled by mass transfer from bulk gas phase to sorbent surface. At higher temperatures, all sorbents showed comparable fast reaction rates during the first minutes and comparable maximum conversion with carbon dioxide during five hours carbonation. All samples showed high conversion of more than 95% over three cyclic carbonation/calcination periods. Experiments of long term cyclic carbonations/calcinations are currently performed to compare the performance of the sorbents synthesized from the both methods.