Abstract:
Carbonate looping is an emerging CO2 capture technology applicable to combustion flue gases and gasification synthesis gases. Naturally occurring carbonate sorbents for this process demonstrate different characteristics depending on its geographical origins and process conditions. Thermo gravimetric analyses were carried out on four limestone samples from various origins by varying calcination and carbonation temperatures. Increasing calcination temperature increased the rate of calcination while significantly reduced the degree of carbonation. Sintering of the particles at high temperatures could be the cause. Carbonation occurred in two phases, identified as chemically controlled fast reaction and diffusion controlled slow reaction. The rate of reaction in the fast reaction phase was faster at 650°C than that of 700°C carbonation, while the total conversion of CaO to CaCO3-mole.