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Lithium as energy storage material

Abstract:

Lithium has a certain potential to act as an energy storage material. Its tendency to react exothermally with all typical constituents contained in power plant exhaust gases offers a variety of options to design combustion processes for energy production.

As most promising approach to use lithium in thermal processes spray combustion has been identified. The small particle size guarantees fast conversion, which determines the efficiency of the process. However, information in literature has been scarce and indicated a need for detailed investigation on the single particle level for better understanding of the combustion phenomenology and for derivation of input parameters for simulation tools.

The talk summarizes the experimental and numerical research which has been carried out at Bochum University. Combustion experiments on single burning lithium particles were carried out in CO₂, N₂ and mixtures of both. The combustion phenomenology, particle temperatures and particle burnout were measured. A first numerical model, which has been developed to implement the combustion process of single burning lithium particles in 2D CFD simulations is described.