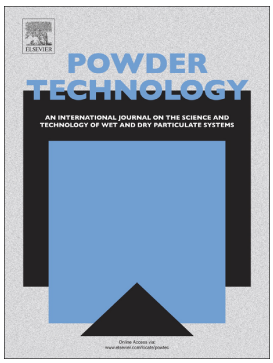

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Impact of solids loading and mixture composition on the classification efficiency of a novel cross-flow fluidized bed classifier

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Abstract

Calcium looping with indirect heat transfer between the main combustor and the calciner is a CO_2 capture technology with low energy penalty. One way of transferring the heat, is heating of inert particles by hot combustion gases in the combustor followed by heating and calcination of sorbent ($CaCO_3$) particles by direct contact with the inert heat transfer particles in the calciner. In this process, it is crucial to separate the sorbent and the heated inert solids at the end of the calcination process. Hence, a highly efficient classification device operating at temperatures above 900°C is required. In this work, a downscaled cold-flow version of a cross-flow fluidized bed classifier was studied as novel classification method. The classification efficiency and the pressure drop in the classifier were measured when varying solids loading (mass flow of solid feed / mass flow of fluidization air) and mixture composition using ambient air as the fluidization medium. Different mixtures of zirconia (D_{mean} = 69 μm; ρ = 3800 kg/m³) and steel (D_{mean} = 290 μm; ρ = 7800 kg/m³) were used. The