

One-dimensional modeling of a turbulent fluidized bed for the solid sorbent-based CO₂ capture process

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A new one-dimensional (1-D) model for a turbulent fluidized bed for CO₂ capture process using polyethylenimine (PEI)-silica sorbent is proposed to analyze process performance including the adsorption and desorption bed. The contact efficiency equation derived from the intrinsic kinetics is well established to acquire the rigorous model. The combined governing equation is used to improve feasibility of the Kunii-Levenspiel model widely utilized for the fluidized bed. The energy demand for CO₂ capture is discussed with those obtained using a 1-D model and through a sensitivity analysis.