Modeling the Desulfurization Characteristics of a Bubbling Fluidized Bed Hot Gas Cleanup System

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A mathematical model has been developed to predict performance of a continuous bubbling fluidized bed hot gas desulfurization system in the integrated gasification combined cycle (IGCC). For both the bubbling fluidized bed desulfurizer and the bubbling fluidized bed regenerator, the model combines the particle residence time with the kinetic rate in each reactor. The model has been applied to the KIER's laboratory scale fluidized bed process. The present model provides a reasonable fit in predicting the experimental result that the outlet concentration of H_2S increased nearly proportionally to the inlet concentration of H_2S in the desulfurizer and the sulfur concentration in bed particle increased after an initial decrease as the particle size decreased in each reactor.