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Application of response surface methodology to determine effects of operational conditions on in-bed combustion fraction in vortexing fluidized-bed combustor using different fuels

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1	Application of response surface methodology to determine
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11	Abstract: Distinct secondary gas injection modes of a vortexing fluidized-bed combustor (VFBC)
12	affect combustion fraction distribution, resulting in different combustion and pollutant emissions
13	characteristics. To determine the important operational conditions, correlations that consider most
14	of the VFBC parameters were derived to predict the in-bed combustion fraction in VFBC. The
15	predictions obtained using the regression correlation analysis were in good agreement with the
16	results of present experiments and with previously published results. Response surface methodology
17	(RSM) was used to analyze the sensitivity of different coded factors based on established model. A
18	new correlation equation, with a fewer parameters, based on the sensitivity analysis, was also
19	developed and exhibited a positive predictive accuracy. Results demonstrate that the primary gas
20	ratio, particle size, and fuel type significantly affect the combustion fraction. The in-bed combustion
21	fraction increases with increasing particle size, and decreases with increasing primary gas ratio and
22	the ratio of volatile to fixed carbon.

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