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Effect of oxygen concentration on low-temperature exothermic oxidation of pulverized coal

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Highlights

- Exothermic of pulverized coal on various oxygen concentrations was researched.
- Revealing three oxidation stages of low-temperature oxidation of pulverized coal.
- Apparent activation energies on various oxygen concentrations were investigated.
- Low oxygen concentration had inhibitive effect on exothermic of pulverized coal.

ABSTRACT

Low-temperature exothermic oxidation characteristics of pulverized sub-bituminous coal was investigated using differential scanning calorimetry system in atmospheres where the oxygen concentrations were 21, 17, 13, 9, and 5 vol. %, respectively. The results indicate that the heat flow gradually decreases after it reaches the maximum value. A decreased oxygen concentration had a delaying effect on the heat flow and derivative of heat flow curves. A low oxygen concentration has typical stage characteristics for inhibiting the exothermic oxidation of pulverized coal. The oxygen concentration has a significant influence on the kinetics characteristics and kinetics parameters. The apparent activation energy increased under different oxygen concentrations with an increase in the

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