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Dry and separation of fine lignite in pulsed fluidized bed system

Lignite is an abundant raw coal resource, which is increasingly implemented as a primary energy supply worldwide. However, due to the characteristics of high moisture content, high ash content, high volatile content and low calorific value etc., the direct combustion of lignite results in low combustion efficiency, high transportation cost. In order to implement lignite as energy source and increase the utilization efficiency, the upgrading of lignite by discarding and removing moisture prior to direct use is necessary. Coal separation and simultaneously drying technologies have the superiorities of avoiding lignite slimming in separation process and attenuating the adverse effect of liquid bridge between lignite particles on particle diffusion and stratification in the separation process. The pulsed fluidized bed is typical coal separation and drying system, which implements pulsating air flow to promote the diffusion and stratification of particles and improve the drying performance and separation efficiency. In the proposed work, a novel autogenous medium pulsed fluidized bed system was established targeting at separating and simultaneously drying the fine lignite. The core of the system involves: gas heater, pulsating system and fluidized bed with thermocouple measuring equipment. The electrical heater consists of electrical heating tubes. Controller is responsible for setting the range of heating temperature in order to satisfy experimental requirements. In the experiment, the drying process and separation process were conducted simultaneously under different superficial velocities. After each separation, the products were sampled and analyzed in terms of ash content and moisture content. Results show that the calorific capacity have been increased significantly and the moisture content of lignite has been decreased.

Biography

Chenlong Duan is a Professor of Mineral Processing, the Vice Dean of Graduate School, China University of Mining and Technology (CUMT). He is a Member of American Society of Engineering Education, Youth Council of Chinese Society of Particology and has been nominated as Standard English Interpreting Expert for Coal Industrial Engineering Construction Project. He has published more than 180 papers in reputed journals and applied 10 invention patents in USA and China.

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