Dynamic characteristics and mode switching behavior of an oxy - circulating fluidized bed system

웬황호이, 송병호†, 선도원[1], 이재구[1]
군산대학교; [1]에너지기술연구원
(bhsong2006@gmail.com†)

Oxy-circulating fluidized bed combustion (Oxy-CFBC) is one of the promising prospects for the carbon capture from coal power plants and can be retrofitted from existing plants. The dynamic model gives help to identify control strategies, operating procedures that bases on a dynamic analysis of the air-firing condition. The objectives of this study are to investigate the dynamic behavior of the mode transition of an Oxy-CFBC plant. The model applied principles of mass, energy balance, and chemical kinetics of bituminous coal. The results show that CO_2 concentration can be achieved 88.2 vol.% without air-ingress in oxy-fired condition. The sensitivity of dynamic analysis revealed that the high CO_2 purity was strongly affected by the air-leakage amount. The CO_2 was reduced by 25 % (from 88.2 to 66 %) with 5% of air ingress. A smooth transition from the air-fired mode to oxy-fired mode and the vice versa process can be obtained by applying a similar ramp step change of the input signals. In addition, the response of the flue gas and temperature were explored under load changes. The comparison of the simulation with the 2 MW_e Oxy-CFBC experimental results showed a good agreement.