Reburning Characteristics of Biomass Syngas in a Pilot Scale Heavy Oil Furnace

Authors : Sang Heon Han, Daejun Chang, Won Yang

Abstract : NOx reduction characteristics of syngas fuel were numerically investigated for the 2MW pilot scale heavy oil furnace of KITECH (Korea Institute of Industrial Technology). The secondary fuel and syngas was fed into the furnace with two purposes- partial replacement of main fuel and reburning of NOx. Some portion of syngas was fed into the flame zone to partially replace the heavy oil, while the other portion was fed into the furnace downstream to reduce NOx generation. The numerical prediction was verified by comparing it with the experimental results. Syngas of KITECH's experiment, assumed to be produced from biomass, had very low calorific value and contained 3% hydrocarbon. This study investigated the precise behavior of NOx generation and NOx reduction as well as thermo-fluidic characteristics inside the furnace, which was unavailable with experiment. In addition to 3% hydrocarbon syngas, 5%, and 7% hydrocarbon syngas were numerically tested as reburning fuels to analyze the effect of hydrocarbon proportion to NOx reduction. The prediction showed that the 3% hydrocarbon syngas is as much effective as 7% hydrocarbon syngas in reducing NOx.

Keywords : syngas, reburning, heavy oil, furnace

Conference Title : ICFMHTT 2015 : International Conference on Fluid Mechanics, Heat Transfer and Thermodynamics **Conference Location :** Istanbul, Türkiye

Conference Dates : March 23-24, 2015