Abstract:
The use of biomass for energy generation is getting increasing attention. At present, gasification of biomass is taken as a popular technical route to produce fuel gas for application in boilers, engine, gas turbine or fuel cell. Up to now, most of researchers have focused their attentions only on fixed-bed gasification and fluidised bed gasification under airblown conditions. In that case, the producer gas is contaminated by high tar contents and particles which could lead to the corrosion and wear of blades of turbine. Furthermore, both the technologies, particularly fixed bed gasification, are not flexible for using multiple biomass-fuel types and also not feasible economically and environmentally for large scale application up to 10-50 MWth. An innovative circulating fluidised bed concept has been considered in our laboratory for biomass gasification thereby overcoming these challenges. The concept combines and integrates partial oxidation, fast pyrolysis (with an instantaneous drying), gasification, and tar cracking, as well as a shift reaction, with the purpose of producing a high quality of gas, in terms of low tar level and particulates carried out in the producer gas, and overall emissions reduction associated with the combustion of producer gas. This paper describes our innovative concept and presents some experimental results. The results indicate that the gas yield can be above 1.83 N m(3)/kg and the fluctuation of the gas yield during the period of operation is 3.3.