Entrained flow gasification of coal/bio-oil slurries

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Coal/bio-oil slurry (CBS) is a new partial green fuel for bio-oil utilization. CBS reacts with gasification agents at high temperatures and converts into hydrogen and carbon monoxide. This paper provides a feasibility study for the gasification of CBS in an atmospheric entrained flow reactor for syngas production. Experiments have shown that CBS can be successfully processed and gasified in the entrained flow reactor to produce syngas with almost no tar content and low residual carbon formation. High reactor temperature and steam/carbon ratio is favourable for H2 production. At 1400 °C with steam/carbon ratio of 5, the syngas components are similar with that in equilibrium. A synergistic effect exists between coal and bio-oil in coal/bio-oil slurry gasification which might be caused by the catalysis effect of alkali metals and alkaline earth metals in bio-oil.

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