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Thermodynamic Characteristics of a Large Scale Downdraft Gasifier in a Scalar Energy Field

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Abstract :

Thermodynamic Characteristics of a Large Scale Downdraft Gasifier in a Scalar Energy Field Ero F.A1 , Makaka G.1 and Mamphweli S.2Department of Physics1, Institute of Technology2 University of Fort Hare, South Africa1AbstractA thermodynamic evaluation of parametric characteristics of a large-scale downdraft gasifier in a scalar energy field has been made, as a preliminary approach to assess the technical feasibility of electrical energy production from a large-scale downdraft gasifier. Thermodynamic equilibrium calculations have been made to predict conversion levels in a reactor using pine wood as a biomass feedstock and air as the gasifying agent. The performance of the biomass gasifier system is evaluated in terms of equivalence ratio, producer gas quality, and cold gas efficiency. Mass and energy balance in a 300m³/h gas production reactor to examine the reliability of the results generated. The allowable electrical efficiencies of the pine wood product-gas in a scalar energy field have been calculated for different gasifier operating conditions, namely air/biomass ratio and gasifier operating temperature. The final paper will present the results obtainedKeywords: Biomass; Gasification; Producer gas; Downdraft gasifier; Equivalence ratio, Scalar energy field

Award :

Yes

Level :

Ph.D

Supervisor :

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Paper :

Yes

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