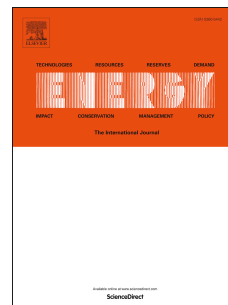


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# An experimental study of a thermochemical regeneration waste heat recovery process using a reformer unit

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## Abstract

This paper presents a thermochemical regenerative heat recovery process for utilizing the waste heat of oxy-fuel furnaces, with three significant modifications compared to current state-of-the-art reforming concepts. (I) Experimental tests with a reformer test rig were performed, in order to investigate the bi-reforming of methane into syngas by using water and carbon dioxide with a steam-to-carbon ratio of 0.5. The measured syngas concentrations were compared to calculated equilibrium values and carbon deposits were determined. A methane conversion rate of 95.3% was achieved. (II) Carbon deposits in a regenerator bed are usually burned with purge gases. In contrast to this procedure, oxygen was added to the fuel/exhaust gas mixture in order to cause tri-reforming of methane with a steam-to-carbon ratio of 0.4. The syngas concentrations were compared to equilibrium values and it was found, that tri-reforming significantly reduces carbon formation. A methane

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