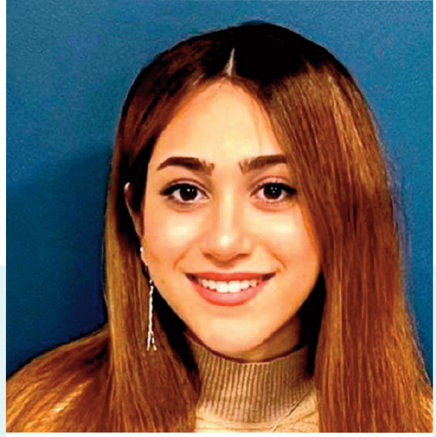
POSTER EXPOSITION

Poster 6

Swansea University
Prifysgol Abertawe

Capture and reduction of carbon emissions to maximize circularity in the steelmaking process



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ABSTRACT:
With the challenging targets of the climate agreements being set, the steel industry sector logically seeks for possibilities to reduce their greenhouse gas emissions, as well as to incorporate green energy sources in the steelmaking process itself. Waste gases generated during steelmaking are an enormous source of CO & CO2 emissions. Rather than supply heat and power to the plant by combustion, those gases can be utilized efficiently at a low cost to produce renewable fuels. In steel production by blast furnace technology, three main off-gases are generated, namely the Blast Furnace Gas (BFG), the Coke-Oven Gas (COG), and the Basic Oxygen Furnace Gas (BOFG).

As synthetic natural gas can be directly utilized in the integrated steelworks again, substituting for natural gas, the in situ methanation of real steelworks gases in a lab-scaled is provided in our research work. To direct carbon capture and utilization, BFG and BOFG as carbon source and H2-rich COG as hydrogen supplier otherwise using hydrogen production throughout electrolysis process, to reach high methane yield is designed. Therefore, a two steady process, first, production a CO2-rich gas through a catalytic WGS reaction using BFG and BOFG, then methanation of the streae by H2-rich COG as hydrogen supplier is presented.

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