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Syngas Desulphurization in a Coal Gasification Pilot Plant for Hydrogen Production

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Abstract

Nowadays, the need for a diversification in primary energy sources has led an increasing interest in coal, which allows a larger price stability and represents a reliable primary source from a strategic point of view. Coal gasification processes, in particular, allow an efficient use of this energy source, with a low environmental impact. Moreover, these processes allow hydrogen (and other environmental-friendly fuels) and electric power co-production. To this effect, Sotacarbo, together with Ansaldo Ricerche, ENEA and the Department of Mechanical Engineering of the University of Cagliari, is developing a pilot plant to test the use of gasification technologies for the combined production of hydrogen and electric power in medium and small scale commercial plants. In particular, the pilot plant is made up of two up-draft fixed-bed gasifiers, respectively 700 and 35 kg/h of coal, the latter equipped with a syngas treatment line, including the depulverization, desulphurization, water-gas shift conversion, CO2 separation and hydrogen purification sections. This paper reports the main results, achieved by a calculator simulation, of a preliminary analysis carried out to assess the main operating parameters of the integrated process, with particular reference to the syngas desulphurization section.