

***Sotacarbo R&D project for hydrogen production from coal
and CO₂ removal***

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Abstract

Nowadays, the increase in energy demand and the interest in the environment preservation, have improved the attention toward hydrogen production through coal gasification, owing to the remarkable advantages offered by this technology in pollution control and greenhouse gases-emissions monitoring.

To this aim, Sotacarbo, with Ansaldo Ricerche, ENEA and the University of Cagliari, is developing a research project to design, construct and test a pilot plant for hydrogen production from Sulcis coal gasification. The project, characterized by a total cost of about 11.5 millions euros, has been funded by the Italian Ministry of Education, University and Research (MIUR) and by the European Commission.

The pilot plant, which will be soon set up in the Sotacarbo Coal Research Centre located in Sardinia (Italy), includes two fixed-bed Wellman-Galusha gasifiers (a 700 kg/h pilot gasifier and a 35 kg/h laboratory-scale gasifier), fed up with high and low sulphur coals, and a syngas treating process, which is composed by a raw-gas cleaning section, an advanced integrated water-gas shift and CO₂ removal unit and the hydrogen separation unit. In particular, the raw gas cleaning section includes a hot- and a cold-gas desulphurization process, in order to compare their performances.

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 gasification process and the hydrogen production line. In particular, the effects of a number of the main process operating parameters on the gasification system and on downwards treatment sections have been analyzed. The gasification air enrichment with oxygen is, among the other parameters, particularly interesting.

Key-Words: Coal gasification, Sulcis coal, Pilot plant, CO-shift, CO₂ removal, Hydrogen production

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