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ELECTRICITY GENERATION AND ATMOSPHERIC POLLUTION: THE ROLE OF SOLID FUELS GASIFICATION

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ABSTRACT

Electricity generation in solid fuel fired power stations is currently the main source of flying particulates and greenhouse gases emissions. Environmental pollution is expected to deteriorate dramatically in the coming century unless pollution abatement technologies for solid fuels energy conversion will be applied. The Integrated Gasification Combined Cycle (IGCC) system, currently under industrial testing, provides for high solid fuel energy conversion efficiency (e.g. ~ 45 %) and favors the application of proven technologies for gas purification (e.g. H_2S oxidation to elemental sulfur, CO_2 separation and disposal as a stable carbonate solid). Additionally, gasification combined with fuel cell technology (CGFC) may provide in the long run, for energy conversion efficiency well over 50%. This article reports also the results of pilot plant lignite gasification tests for the production of a medium heating value synthesis gas using a novel indirect heat (allothermal) gasification process (ALLOGAS). The latter process employs an indirect heat rotary kiln gasifier and is considered as the most appropriate to gasify moist lignite with the minimum pretreatment.