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(54) Title: CONTROLLING THE SYNTHESIS GAS COMPOSITION OF A STEAM METHANE REFORMER

(57) Abstract: A method for controlling the synthesis gas composition obtained from a steam methane reformer (SMR) that obtains its feedstock as product gas directly from a steam hydro-gasification reactor (SHR). The method allows control of the H₂/CO syngas ratio by adjusting the hydrogen feed and the water content of feedstock into a steam hydro-gasification reactor that supplies the SMR. The steam and methane rich product gas of the SHR is generated by means of hydro-gasification of a slurry of carbonaceous material and water. The mass percentages of the product stream at each stage of the process are calculated using a modeling program, such as the ASPEN PLUS™ equilibrium process. By varying the parameters of solid to water ratio and hydrogen to carbon ratio, a sensitivity analysis can be performed that enables one determine the optimum composition of the slurry feedstock to the SHR to obtain a desired syngas ratio output of the SMR. Thus one can adjust the hydrogen feed and the water content of feedstock into the SHR that supplies the SMR to determine the syngas ratio output of the SMR.



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