Gasification and Pyrolysis of Posidonia oceanica in the Presence of Dolomite

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Thermochemical conversion pathways of biomass for the production of primary energy by direct combustion, as well as other thermal processes, have a remarkable drawback among others: tar formation. In the present work, a detailed study of the reforming of syngas produced in the decomposition of Posidonia oceanica is done. The effect of the presence of different amounts of dolomite is analysed. Gasification of the species is done in the presence of sub-stoichiometric air, analyzing the produced gases. Also pyrolysis is studied, in nitrogen atmosphere, and gasification in the presence of air, oxygen and different amounts of steam. A discussion on formation and destruction of tars is done. Furthermore, the effect of the heating rate in the decomposition and the residence time of the evolved gases are discussed. Syngas with ratio H2/CO from 0.3 to ca. 3 can be obtained from this interesting material. It can be concluded that: 1) The presence of increasing percentages of water vapor in the reaction gases in the presence of dolomite increases the ratio H2/CO and decreases the NCV of the gas for all reaction atmospheres and residence times; 2) The highest values of the ratio H2/CO and less NCV are obtained for combustion in sub-stoichiometric air and low residence time; 3) The possible use of syngas goes from heat engines use with internal and external combustion to the processing fluid for obtaining biofuels, methanol, ammonia, synthetic natural gas and hydrogen; 4) If atmospheres are used with an amount of oxygen, it would be necessary a post-treatment aimed to remove the oxygen gas. Marine species (microalgae) are usually studied with the aim of cultivate

them for gas or oil production, but in this work we draw attention to the possibility of using a natural resource with a very small impact in the ecosystem.

Keywords: gasification, reforming, Posidonia oceánica.

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