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AN EXPERIMENTAL SETUP FOR PLASMA GASIFICATION OF SEWAGE SLUDGE

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ABSTRACT

The current environmental policies of the EU regarding the waste management focus on a circular economy concept with emphasis on the reduction of the wastes that goes to the landfills. In this context, the re-use of sewage sludges as an energy resource can be an attractive solution, mainly for the sector of the paper and wastewater treatment plants. The plasma gasification of sewage sludges, even challenging, is pointed out as an option for waste valorization. However, there is several technical aspects that must be investigated in order to make this solution attractive to the market. The conversion of the chemical energy contained in this raw material into the desired syngas depends on several factors such as the adequate configuration of the gasification system, its dimensioning, as well as the correct definition of the gasifier operating conditions. To provide a solution, this work focus on the design of a plasma gasifier for valorization of sewage sludges. Data is provided regarding the sewage sludge composition and origin, using a DSC-TGA technique and the selection of the different elements that compose the gasification system in function of the expected operating conditions is provided. Moreover, a preliminary analysis of the mass and energy balances of the thermochemical conversion of the system is conducted applying theoretical models.

KEY WORDS: Circular economy, Gasification, Plasma, Sludge