



CHARACTERISTICS OF WATER VAPOR PLASMA TORCH USED IN THERMAL PLASMA REFORMING

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ABSTRACT

The atmospheric pressure plasma torch with a direct current arc discharge stabilized by water vapor vortex was experimentally investigated. Overheated up to 450K water vapor was used as plasma forming gas. Plasma torch design is one of the most important factors leading to a stable operation of the device. The electrical and thermal characteristics of the plasma torch were determined during the experimental investigations. The design and the basic characteristics of the water vapor plasma torch are presented in the paper. Plasma torches with the electric arc stabilized by water vapor vortex provide special performance characteristics in some plasma processing applications such as thermal plasma neutralization and destruction of organic wastes enabling to extract high caloric value synthesis gas as by-product of the process. Syngas could be used as a surrogate fuel partly replacing the dependence on the fossil fuels or used as a feedstock for hydrogen, methanol production.

Keywords: atmospheric pressure thermal plasma, arc discharge, water vapor