

INTERACTION OF METHANE WITH THERMAL CARBON DIOXIDE PLASMA OBTAINED IN THE AC PLASMA TORCH

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Currently the problem of obtaining synthesis gas from natural gas (re-forming) is topical. In this case main reagents are steam, carbon dioxide and oxygen. Carbon dioxide is a greenhouse gas, so its emissions into the atmosphere should be limited. However, the interaction of methane with carbon dioxide is a strong endothermic process. There are a number of scientific papers devoted to the interaction of CO₂-plasma with methane. For this, DBD, corona discharge, DC arc discharge and etc. are used. The report deals with the interaction of methane with carbon dioxide in a high-voltage three-phase AC plasma torch. The power source of the plasma torch consists of current-limiting reactors, the reactive power compensator and the high-voltage transformer (10 kV). The plasma torch consists of three arc channels with three rod copper electrodes. Carbon dioxide (3.7 g/s) and methane (1 g/s) are supplied to the near-electrode zone, and carbon dioxide (3.2 g/s) and methane (1.4 g/s) are supplied to the arc zone. The electric power of the plasma torch was 110 kW. The composition of the synthesis gas was determined by a mass spectrometer using calibration mixtures. The synthesis gas contained CO 50 percent vol. and H₂ 50 percent vol. without the formation of soot. This indicates a high efficiency of processing methane into synthesis gas.