HIGH VOLTAGE AC PLASMA TORCH OPERATING ON VAPORS OF ORGANIC SUBSTANCES

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The report deals with a three-phase high-voltage plasma torch with separate supply of gases and vapors during its operation on a mixture of steam, carbon dioxide, methane and chlorobenzene vapors. Increase in the chlorobenzene flow rate leads to increase in the arc voltage drop and electric power from 100 to 140 kW.

In most cases, waste from production of chlorine-containing substances have high toxicity and thermal stability. Traditional combustion is impossible due to the formation of dioxins. There are a number of methods for processing chlorine-containing substances: catalytic reduction, fusion with alkalis, destruction by thermal air plasma [1, 2]. Plasma torch with separate feeding of plasma-forming media into the near-electrode zone and into the arc combustion zone has been developed in IEE RAS [3, 4]. The shielding gas (carbon dioxide) is supplied into the near-electrode zone, and other gases and vapors of organic and inorganic liquids may be fed into the arc zone. Operation of the plasma torch on a mixture of carbon dioxide (2.9 g/s), steam (2.9 g/s), methane (0.3 g/s) and chlorobenzene vapor (0-3.56 g/s) is discussed in the paper. Short-circuit current of the source is 55A. No load voltage is 10 kV. As can be seen from the figure, the electric arc voltage drop of plasma torch increases with increasing of C_6H_5Cl flow rate. This is due to increase in the thermal heat losses of the arc (proportion of hydrogen in the mixture increases).

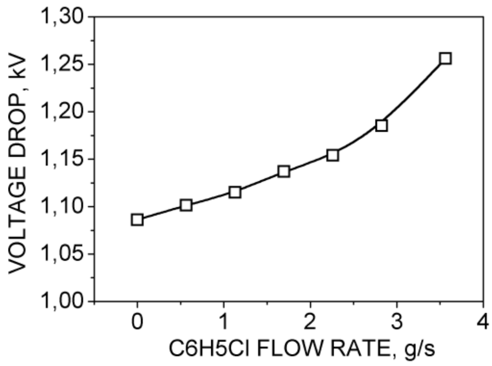

Figure. Dependence of the arc voltage drop versus chlorobenzene flow rate.

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