

技术及应用

直流电弧等离子体点火器射流特性研究

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摘要 采用光谱仪测量了等离子体点火器出口射流的发射光谱, 利用玻尔兹曼曲线斜率法计算了射流的电子温度, 并通过电离平衡方程计算了射流气体温度, 获得点火器出口射流长度、射流速度、电子温度和射流温度随弧电流及进口氩气流量的变化规律。并分析了航空等离子体电弧射流中是否可使用电子温度来代替射流气体温度。实验表明: 弧电流随着进口氩气流量的增大而减小; 出口射流长度和速度随弧电流的增大而增大, 随进口氩气流量的增大先增大后减小; 出口电子温度、电子密度和射流温度随弧电流的增大而升高, 随氩气流量的增大而降低。

关键词 [电弧](#) [等离子体](#) [电子温度](#) [电子密度](#) [射流](#)

分类号

Characteristic Study of DC Electric Arc Plasma Ignitor Jet

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Abstract The spectrometer was adopted to measure the emission spectrum of Ar plasma jet at the ignitor exit. Boltzmann curve slope method was applied to calculate the jet electron temperature. Ionization equilibrium equation was used to calculate jet temperature and measure the laws that jet length, jet velocity, electron temperature and jet temperature of ignitor exit change with arc current and inlet Ar flow rate. Whether the electron temperature could be used to replace jet temperature in aircraft plasma arc jet was also discussed. The experiment results show that arc current reduces with the rising of inlet Ar flowrate; exit jet length and velocity increase with the rising of arc current, and increase at first and then reduce with the rising of inlet Ar flow rate; exit electron temperature, electron density and jet temperature increase with the rising of arc current and reduce with the rising of inlet Ar flow rate.

Key words [electric arc](#) [plasma](#) [electron temperature](#) [electron density](#) [jet](#)

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