World Academy of Science, Engineering and Technology
International Journal of Energy and Power Engineering
Vol:8, No:11, 2014

Temperature Calculation for an Atmospheric Pressure Plasma Jet by Optical Emission Spectroscopy

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Abstract : The objective of the study is to be able to calculate excitation and vibrational temperatures of a 2.45 GHz microwave-induced atmospheric pressure plasma jet. The plasma jet utilizes Argon gas as a primary working gas, while Nitrogen is utilized as a shroud gas for protecting the quartz tube from the plasma discharge. Through Optical Emission Spectroscopy (OES), various emission spectra were acquired from the plasma discharge. Selected lines from Ar I and N2 I emissions were used for the Boltzmann plot technique. The Boltzmann plots yielded values for the excitation and vibrational temperatures. The various values for the temperatures were plotted against varying parameters such as the gas flow rates.

Keywords : plasma jet, OES, Boltzmann plots, vibrational temperatures
Conference Title : ICPP 2014 : International Conference on Plasma Physics
Conference Location : Kyoto, Japan
Conference Dates : November 13-14, 2014