

Study on Operational Characteristic of Microwave Oven Driven Plasma Spray Device

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Abstract:

Microwave oven induced plasma method is a novel application of microwave oven to generate plasma for coating process. By using integrated microwave system with low cost 2.45 GHz magnetrons, low initial setup cost is able to be achieved in compare to conventional plasma spray methods. The innovation of microwave oven induced plasma spray is seen as a good candidate for future research study due to its easily operable at low power. It requires relatively low power compared to conventional plasma spraying method and able to be generated at atmospheric pressure conditions. However, the research regarding this microwave oven induced plasma spray is very less and the mechanisms are still more to be discovered. Therefore, our research is focusing on the understanding of the operational characteristics of microwave oven driven plasma spray device. 0.8 kW output power is used in this research, and by controlling the working gas flow rate and antenna outlet diameter, the plasma had been able to be generated at 2, 3, and 4 mm antenna outlet diameter with 10, 15, and 20 lpm flow rates of argon gas. The widest plasma plume had been able to be generated was at 20 lpm for the each of antenna diameter, and at 3 mm of outlet antenna diameter with 15 lpm of argon (Ar) gas flow rates, it is the acceptable condition for producing plasma plume.

Keywords: Microwave Plasma; Plasma Spray; Plasma Plume

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