

Heat source property of pulse Tungsten Inert Gas arc

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Summary

Tungsten Inert Gas (TIG) arc is suitable as a heat source device for many applications because it can stabilize high temperature arc plasma easily by employing shielding gas. The arc plasma is produced between a tungsten cathode and an anode material. TIG arc has many advantages as a heat source device such as high heating efficiency, highly controllable characteristics and low cost for equipment investment. Therefore, it is widely utilized, for example, for material processing such as melting, cutting and welding, or decomposition, volume reduction and detoxification of toxic waste and so on.

The heat source property of TIG arc can be controlled by an input current waveform. In arc welding process DC TIG arc is generally employed. It is applicable to welding process for almost all kind of metal except for aluminum and magnesium. In case of aluminum and magnesium AC TIG arc is utilized to remove an oxide layer on a base metal surface. Furthermore pulse TIG arc is suitable especially for back-bead welding and thin plate welding, because the heat input property into the base metal can be controlled precisely by adjusting peak / base current ratio and frequency.

A number of experimental and theoretical investigations of the heat source property of DC TIG arc have been conducted. However, those of AC and pulse TIG arc are still not fully understood because of the complexity. In this presentation, numerical simulation result of the heat source property of pulse TIG arc will be reported.

