

Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Distribution of Argon Arc Contaminated with Nitrogen as Function of Frequency in Pulsed TIG Welding HIROKI TAKAHASHI, TATSURO TANAKA, SHINJI YAMAMOTO, TORU IWAO, Tokyo City University, Setagaya, Tokyo 158-8557, JAPAN — TIG arc welding is the high-quality and much applicable material joining technology. However, the current has to be small because the cathode melting should be prevented. In this case, the heat input to the welding pool becomes low, then, the welding defect sometimes occurs. The pulsed TIG arc welding is used to improve this disadvantage. This welding can be controlled by some current parameters such as frequency. However, few reports have reported the distribution of argon arc contaminated with nitrogen. It is important to prevent the contamination of nitrogen because the melting depth increases in order to prevent the welding defects. In this paper, the distribution of argon arc contaminated as a function of frequency with nitrogen in pulsed TIG welding is elucidated. The nitrogen concentration, the radial flow velocity, the arc temperature were calculated using the EMTF simulation when the time reached at the base current. As a result, the nitrogen concentration into the arc became low with increasing the frequency. The diffusion coefficient decreased because of the decrement of temperature over 4000 K. In this case, the nitrogen concentration became low near the anode. Therefore, the nitrogen concentration became low because the frequency is high.

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Date submitted: 10 Jun 2016

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