

Prediction of Anode Temperatures of Free Burning Arcs Using a Simplified Unified Model

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Free burning arcs where the work piece acts as an anode are frequently used for a number of applications. Our investigation is exclusively concerned with a simplified unified model of arcs and anode under steady state conditions at atmospheric pressure. The model is used to make predictions of arc and anode temperatures and arc voltage for a 200 A arc in argon. The computed temperatures along the axis between the cathode tip and the anode surface compare well the measured data. This knowledge of free burning arc features can play a role in developing the atmospheric plasma systems, however, further investigation should include the modelling of Cu evaporation from anode and non-LTE situation near electrodes for more realistic calculations.

Keywords: Free-burning arc (자유연소아크), Thermal plasma (열플라즈마), Arc modeling (아크모델링), Arc-electrode interaction (아크-전극 상호작용), Computational fluid dynamics (전산유체역학)

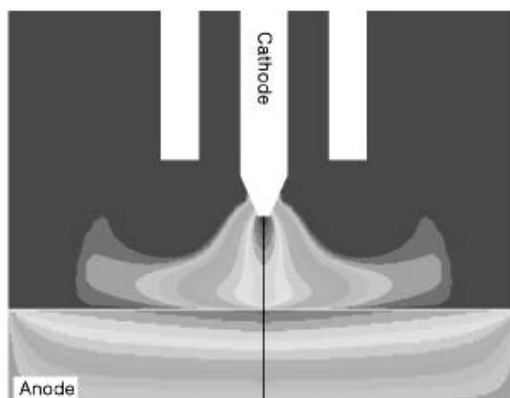


Fig. 1. Temperature and isotherm for a 200 A argon arc 1 atm. In anode, outer isotherm, 1,400 K, interval 25 K for temperature range 1,000-1,400 K, whereas interval 1,000 K is for the temperature range 1,000 K-23,000 K in arc column.