

Abstract Submitted  
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**High-Speed Visualization of Evaporation Phenomena from Tungsten Based Electrode in Multi-Phase AC Arc** MANABU TANAKA, Department of Chemical Engineering, Kyushu University, TARO HASHIZUME, TOMOYUKI IMATSUJI, YUSHI NAWATA, Department of Chemical Systems and Engineering, Kyushu University, TAKAYUKI WATANABE, Department of Chemical Engineering, Kyushu University — A multi-phase AC arc has been developed for applications in various fields of engineering because it possesses unique advantages such as high energy efficiency. However, understanding of fundamental phenomena in the multi-phase AC arc is still insufficient for practical use. Purpose of this study is to investigate electrode erosion mechanism by high-speed visualization of the electrode metal vapor in the arc. Results indicated that the electrode mainly evaporated at anodic period, leading to the arc constriction. Moreover, evaporation of W electrode with 2wt%  $\text{La}_2\text{O}_3$  at the anodic period was much higher than that with 2wt%  $\text{ThO}_2$ . This can be explained by different properties of these oxide additives. Evaporation of the oxide additive resulted in the arc constriction, which accelerated the evaporation of W electrode. Therefore, addition of  $\text{La}_2\text{O}_3$  with lower melting and boiling point than  $\text{ThO}_2$  lead to stronger arc constriction, resulting in severer evaporation of W electrode.

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