

**MOVEMENT AND VOLTAGE FLUCTUATION OF
VACUUM ARC CATHODE SPOTS ON SS400(Fe+C)
SURFACE WITH OXIDE LAYER**

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A remarkable characteristic of a cathode spot of a vacuum arc is that the cathode spot moves around on the metal surface. A cathode spot can remove an oxide layer. Cathode spots of vacuum arcs have been used for cleaning metal oxide surfaces. However, the influence of an oxide layer on cathode spot movement remains unclear. As described herein, cathode spot movements and voltage fluctuation on an oxide layer surface and a metal surface were measured to determine the cathode spot movement and elucidate the existence of cathode spot on the SS400 surface with oxide layer. Experiments were performed using a SS400 cathode and a cylindrical copper anode. A high-speed video camera recorded the cathode spot movement. Then the obtained images were analyzed using plasma image processing. The cathode spot movement was generated mainly on the boundary layer, but sometimes on the processed surface. The first spot remains at the boundary when the cathode spot splits; the second spot moves on the bulk surface and reappears at a different boundary. Therefore, the cathode spot does not appear suddenly; instead it moves continuously during the splitting process. In addition, when the cathode spot exits near the oxide layer, the voltage is fluctuated because of vapor from oxide layer. Therefore, The oxide layer serves an important role for cathode spot existence because of oxide layer vaporization.