

# Jordan University of Science and Technology

## Study of microdroplet generation from vacuum arcs on graphite cathodes

**Authors:** Munther Kandah and J.-L. Meunier

**Abstract:** The emission of microdroplets from the cathode surface in the vacuum arc ion plating deposition technique is the major drawback to the technique's industrial use. The generation of these particles from graphite cathodes is studied in this article and correlated to the local thermal load in the cathode spot area. A pulse discharge was used for a precise control of this load. Increases in the arc current level, arc duration time, and, more generally, the local temperature of the cathode were found to increase the number and the average size of the emitted particles. Particles under these conditions also show an increase in the width of their size distributions. Increasing the distance between cathode and substrate was found to decrease the number density of particles observed on the substrate according to the solid angle covered. The microdroplets show a graphite structure and diameters between 0.2 and 2.0  $\mu\text{m}$ . Conditions needed to decrease the number of particles emitted to the substrate are given.