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**Effect of LaB6 films on field emission by knife edge cathodes<sup>1</sup>**

JOHN BOOSKE, MATT KIRLEY, MARCUS WEBER, NISHANT SULE, BOZIDAR NOVAKOVIC, JOHN SCHARER, IRENA KNEZEVIC, University of Wisconsin-Madison — We present experimental and modeling results of electron field emission from metallic knife edge cathodes coated with LaB6 films. The cathodes are machined from copper, coated with Ti, and then sputter-coated with LaB6. The LaB6 work function (2.3 eV) is significantly lower than that of copper (4.7 eV) or Ti (4.3 eV). However, thick LaB6 films (100-300 nm) significantly reduce the field emission currents compared with the bare copper or Ti-coated cathodes. In contrast, field emission with thin (5-10 nm) LaB6 films significantly increase the emission currents. Modeling studies are investigating a hypothesis that explains these observations as resulting from a quantum transport barrier at the metal-LaB6 interface. It is hypothesized that penetration of the applied field reduces the interfacial barrier for the thinnest films.

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