A pulsed vacuum arc ion source with a pure boron cathode

A. Vasily I. Gushenets¹, Efim M. Oks¹² and Alexey S. Bugaev¹

¹High-Current Electronics Institute SB RAN, Tomsk, 634050, Russia
²State University of Control Systems and Radioelectronics, Tomsk, 634050, Russia

ABSTRACT

The report presents experimental results on a pulsed vacuum arc ion source with an elemental boron cathode. Boron is a semiconductor having a high specific resistance (~1.8 MΩ·cm) under normal conditions and is difficult to sputter and evaporate [1]. Therefore, for arc ignition with pure boron, it is required to preheat the cathode up to 1000 °C. We have designed a high-temperature cathodic unit which uses a special arc triggering technique, provides cathodic arc operation with pure boron, and allows one to decrease the cathode temperature down to 600 °C. For an arc current of 100 A with a duration of 100–300 µs, the 450-mA beam consists of boron ions in singly and doubly ionized states.

References