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Erosion study on graphite cathodes using pulsed vacuum arcs

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Abstract: In this work, the dependence of the cathode erosion rate on vacuum arc spot velocities and cathode pore size are investigated for four types of graphite under an external variable magnetic field. Different graphite cathode properties show varying erosion rates, indicating that each graphite type should be treated as a different material. Increasing the spot velocity through an increase of the magnetic field intensity on a given cathode material decreases the erosion rate. At given magnetic field values, cathodes having higher arc velocities show an increase in the erosion rate. Other studies indicating that the increase in the arc spot velocity leads to a reduction in macroparticles emission indicate a possibility of increasing the emission of the carbon ions component. A decrease in the pore size of the cathode also shows an increase in the cathode erosion rate.