

December 1972

NASA TECH BRIEF

NASA Headquarters



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Prevention of Cathode Damage from Positive Ion Bombardment

The problem:

A plane flat cathode operated in parallel with a plane knitted grid in the presence of gas at low density forms an intense, narrow electron beam at the cathode-grid axis. This beam formation produces an intense positive ion bombardment to the center of the cathode surface which can destroy emissivity in its central region.

The solution:

The destruction of the central portion of the cathode surface can be overcome by geometric changes at the cathode center and by introduction of emission-enhancing substances.

How it's done:

A recess or a hole is formed in the central region of the cathode surface. This recess is then filled with an emission-enhancing substance such as the mixed alkaline earth oxides. The back bombardment of the cathode by positive ions then falls harmlessly on a deep layer of oxides and reduces them. This process creates a metallic

substance such as metallic barium which diffuses along the sides of the recess or hole and enhances the electron emission.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
NASA Headquarters
Code KT
Washington, D. C. 20546
Reference: B72-10654

Patent status:

NASA has decided not to apply for a patent.

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NASA Headquarters
(HQN-10688)

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