December 1972 B72-10654

# NASA TECH BRIEF

*NASA Headquarters*

NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

## 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.

Source: Willard H. Bennett of
Department of Physics of
North Carolina State University
under contract to
NASA Headquarters
(HQN-10688)

Category 03

This document was prepared under the sponsorship of the National Aeronautics and Space Administration. Neither the United States Government nor any person acting on behalf of the United States Government assumes any liability resulting from the use of the information contained in this document, or warrants that such use will be free from privately owned rights.