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NASA TECH BRIEF



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Ohmic Diode

A process for producing linearly responding surface barrier diodes has been developed. In this process, hydrogen-fired, conducting strontium titanate (SrTiO_3) crystals are used to provide linear characteristics.

When crystals are flash heated to about 500°C in an inert atmosphere or vacuum, a thin surface layer is depleted of donors in the n-region, and becomes insulating. A space charge is maintained in this layer by electron diffusion. During manufacture, one face of the crystal is lapped in order to remove this layer. The carrier density in the depletion layer is increased by applying a positive potential to the barrier side of the crystal, making it conductive. The current versus voltage characteristics in this mode is linear. When a reverse potential (negative at the barrier side) is applied, the surface layer of carriers is depleted, making it insulating.

This innovation is novel in that the technique (process) uses space charge potentials and depletion layer phenomena to achieve conduction and insulation.

Notes:

1. This process may be of interest to those concerned with the design and development of electronic components.
2. Requests for further information may be directed to:

Technology Utilization Officer
Headquarters
National Aeronautics
and Space Administration
Washington, D.C. 20546
Reference: B70-10200

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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