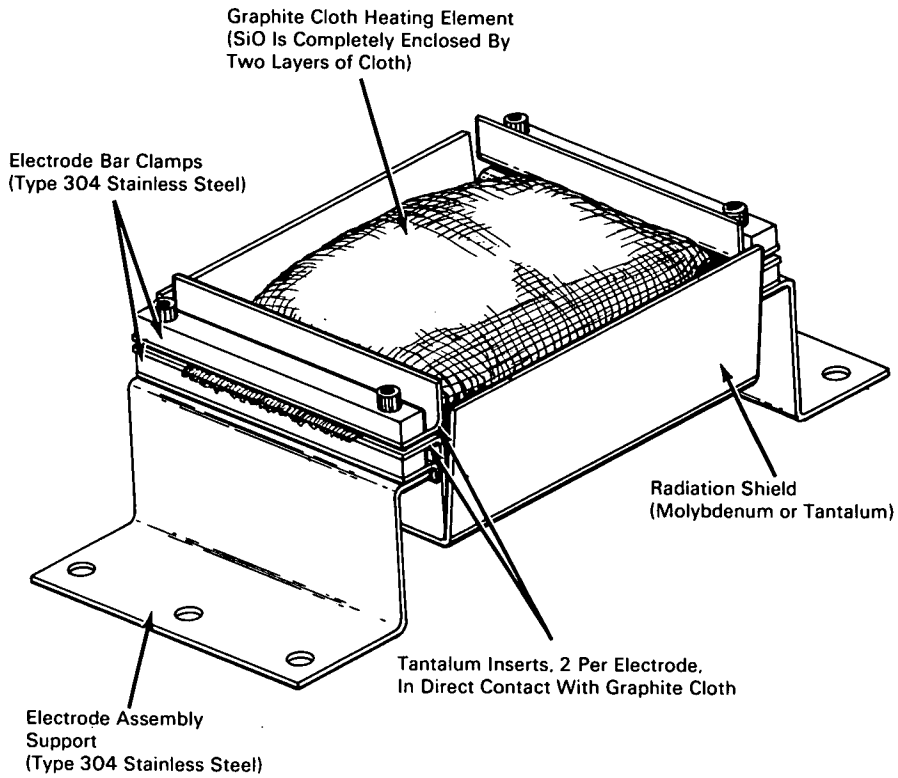
NASA TECH BRIEF

Graphite Cloth Facilitates Vacuum Evaporation of Silicon Monoxide



An improved technique has been developed for the vacuum evaporation of silicon monoxide (SiO) to deposit thin films of this material on various substrates. In this technique, commercially available, closely woven graphite cloth serves both as a container and electric heating element for the SiO. The graphite cloth minimizes or prevents the ejection of SiO particles from the evaporant source (SiO in container) during heating, provides uniform heat distribution to the SiO, and cools rapidly by radiation. Since the graphite cloth source prevents particle ejection, it can be mounted close to the substrate, so that maximum film deposition rates can be obtained for a given (or minimum) source temperature. The relatively high electrical resistivity of the graphite cloth makes practical the construction of broad (extended) vaporization sources, requiring relatively low currents for heating the SiO to the evaporation temperature range. The flexibility of the graphite cloth simplifies the fabrication of broad sources of varied configurations.

(continued overleaf)

Specific source geometries can therefore be readily designed to enable vacuum deposition of continuous, uniform SiO films on irregular or curved substrate surfaces, thereby eliminating the need of rotating the substrates. Since graphite cloth is relatively inexpensive, specific shapes of the cloth prepacked with measured amounts of SiO (or other evaporants) can be used for a single evaporation and discarded after use.

The illustration shows one type of broad evaporant source mounted in an electrode assembly. The source is constructed from two layers of graphite cloth enclosing granules of SiO. The molybdenum radiation shield provides for greater efficiency by limiting heat radiation from the sides and bottom of the source. This assembly has been used to evaporate SiO in vacuum at pressures of 10^{-7} to 10^{-3} torr. Highly insulating films of SiO were deposited on glass substrates, by passing alternating current through the graphite cloth.

Note:

Complete details may be obtained from:

Technology Utilization Officer
Marshall Space Flight Center
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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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