



IJ Research, Inc.

ISO 9001:2000 registered. Established in 1988.

CERAMIC TO METAL SEAL

Our ceramic to metal seal strength has been proven by customers as the best seal and best hermeticity for their applications.

Of our multiple processes, the high temperature refractory metallization offers one of the highest strength for most of applications.

We also use active metal brazing technique on certain configuration. While the ceramic metallization and brazing is a two-step process, the active metal brazing is one-step process and is an excellent choice for certain butt seal. In order to cover all the configurations and shapes, we use the following types:

- **UHT metallization (1800 - 2000C)**
- **HT metallization (1350 - 1600C)**
- **MT metallization (800 - 1100C)**
- **LT metallization (RT - 400C)**

The technique of the metallization is described more in detail in our brochure, *Metallization*.

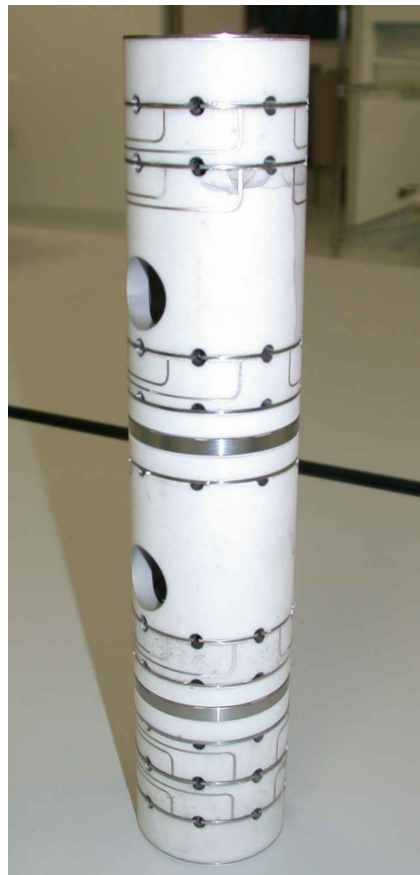
While the refractory metallization followed by a brazing is the most popular for various reasons, the active metal brazing as well as the diffusion bonding can be utilized on certain geometries. Please contact our Applications Engineering Department for details with your specific geometry and requirement at info@ijresearch.com.

Typical applications include a high power laser sapphire window with ceramic housing water cooling system, silica or sapphire view port window with SST flange, autoclavable endoscope's optical windows with SST, Ti or Al housing. Zirconia/SST seals,

alumina/metal for 1000C application. Pyrex/SST or Cu for -300C and 400C application, etc.

Some examples are listed below:

- a. Brazing of sapphire/SST, Germanium/metal, sapphire/Ti alloy.
- b. Brazing of B₄C/Ti alloy, SiC /Ti alloy in large scale as well for military armor application.
- c. Metallization on graphite and brazing it with other metal or ceramic.



The metallic layer on the OD is for a subsequent HT brazing in hydrogen or vacuum. A similar metallization has been used on SiC and Si₃N₄ as well.

- d. Diamond and C-C composite metallization and brazing with other metals or ceramics.
- e. The materials experienced include sapphire (100% alumina), translucent polycrystalline alumina, opaque polycrystalline Al₂O₃ up to 99.8%, AlN, BeO, Si₃N₄, SiC, AlSiC, T:B₂, ZrB₂, BN, graphite, diamond, etc. with Ni/Fe/Co alloy, Ti, Ni alloy, Mo, W, Ta, Pt, SST, etc.
- f. Thermal management: For high efficient vehicle radiator applications and other heat exchanger applications, IJ Research uses ORNL developed and POCO Graphite manufactured carbon foam with enhanced strength for practical applications.

Others include an electronic heat sink and electronic package for a military vehicle propulsion system, high power laser, and high power radar (for space and missile defense agency) applications.

Please contact our Applications Engineering Department for any questions you might have on the subject. Whether your application is hermetic or structural, IJ Research can be your dependable and reliable vendor for your present and next requirements.