Intergranular Metal Phase Increases Thermal Shock Resistance of Ceramic Coating

The problem:
To increase the thermal shock resistance of a plasma-arc-sprayed coating of zirconia used as a heat barrier on a metal substrate.

The solution:
Deposit a small amount of copper on the granules of the zirconia powder before arc-spraying the resultant powder composite onto the substrate. The thermal shock resistance of the finished coating is increased by the dispersed copper phase between the boundaries of the zirconia granules. A composite powder consisting of zirconia with a dispersion of iridium can be plasma-arc-sprayed to provide a coating that maintains its structural integrity at temperatures up to 4000°F in an oxidizing atmosphere.

Notes:
1. Development and evaluation of the composite powders are still at a laboratory level.

2. Inquiries concerning this invention may be directed to:
   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama 35812
   Reference: B66-10651

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

(M-FS-1862 and 1865)