Sandia National Laboratories

Deposition of Graded Thermal Barrier Coatings for Gas Turbine Blades

Summary

Ceramic thermal barrier coatings (TBCs) have been used since the 1970's to protect gas turbine blades from oxidation and corrosion. A lower thermal conductivity is desirable in order to increase component lifetimes by allowing a thinner, lighter ceramic coating to be used. Sandia's method and apparatus for depositing thermal barrier coatings reduces the total processing time which greatly reduces costs by increasing throughput rates. Up to 12 hours of processing time could be saved by using this improved method. Sandia's method also increases the thermal resistance of the blades, allowing for higher operating temperatures which leads to higher efficiency. This technology is only available to companies who can combine Ion Beam Assisted Deposition (IBAD) with Electron Beam Physical Vapor Deposition (EBPVD).

BENEFITS

- Increased thermal resistance of turbine blades
- Lower thermal conductivity
- Reduces cost
- Improves throughput
- Higher turbine efficiency
- Increases component lifetime
- Improved process that reduces processing time

APPLICATIONS

- Jet turbine engines
- Power generation
- Marine propulsion
- Advanced fusion plants
- Gas turbine engines
- Industrial refrigeration

U.S. PATENT Issued #7,838,083

Licensing & Partnering Status:

Various license and partnering options are available. Please contact the Intellectual Property department to discuss.

Technology Readiness Level:

Sandia estimates this technology's TRL at level 7. Demonstration of an actual development version of the method and apparatus has been done in the operational environment.

INTELLECTUAL PROPERTY & LICENSING CONTACT

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