

AUGMENTATION OF THERMAL BARRIER COATINGS BY SMALL PARTICLE PLASMA SPRAY

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The ability to plasma spray fine particles (<10 microns) to form either dense coatings or coatings with closed porosity can result in improved thermal barrier coating systems (TBCs). Thin coatings with closed porosity can be used as seal coats for TBCs, particularly in diesel engines. Furthermore, this technology can be used in conjunction with traditional air plasma spray to apply graded coatings for mitigation of coefficient of thermal expansion mismatch within the ceramic topcoat. In addition, graded porosity can be included in the ceramic topcoat through dual injection. The first injector feeds standard size particles while the second injector feeds fine particles in a controlled fashion that fills in the porosity that would exist if only standard sized powders were used. In addition, small particle plasma spray can be used to prepare thin, multilayered coatings which may provide thermal protection through phonon scattering. This presentation will describe the microstructures obtained by small particle plasma spray and how the technology can augment TBC systems.