MICROSTRUCTURE AND THERMAL CONDUCTIVITES OF SUSPENSION VACUUM PLASMA SPRAYED YSZ COATINGS

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To increase the efficiency of gas turbine, the turbine inlet temperature should increase. As the turbine inlet temperature increases, the heat load of thermal barrier coating increases. Suspension plasma spraying(SPS) was developed to enhance the performance of thermal barrier coating. Suspension allows nano-sized powders to be injected into the plasma flame, which has advantage of forming a variety of microstructures. However, there is a disadvantage of SPS that cannot be completely transmitted the enthalpy of plasma flame due to evaporation of solvent in the suspension, which causes decrement of coating formation rate.

In this study, disadvantages of the suspension atmospheric plasma spraying(SAPS) can be solved by forming YSZ coatings through suspension vacuum plasma spraying(SVPS). The length of plasma flame in vacuum condition becomes longer, powders can stay longer inside the plasma flame.

A variety of microstructured YSZ coatings were formed by SPVS at various spraying conditions. Microstructure of SVPS YSZ coatings were analyzed by SEM. Thermal conductivity of SVPS YSZ coatings were analyzed by laser flash method. Coating formation rate showed