
Durability Evaluation of Thermal Barrier Coating under Ultra-High Temperature for 1650°C Class Gas Turbine

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Abstract

Rise of Turbine Inlet Temperature (TIT) plays a significant role to improve thermal efficiency of Gas Turbine Combined Cycle. Still, it is necessary to improve thermal barrier effect for hot parts to achieve higher TIT. Mitsubishi Heavy Industries, Ltd. has developed the advanced thermal barrier coating (TBC) which is capable of improving cooling efficiency of hot parts. and increased the thickness to satisfy the requirement. Although thicker TBC enhances its thermal protection capability, it is more likely to get buckling failure of TBC. This is caused by higher compressive thermal stress due to increase of a temperature differential between TBC surface and metal surface. This study introduces about advanced experimental techniques and methods to evaluate the durability of thick TBC under ultra-high temperature which simulated the severe environment of real gas turbine.

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