

## Hot Corrosion Behavior of Calcium Zirconate Modified YSZ Coatings

**Authors :** Naveed Ejaz, Liaqat Ali, Amer Nusair

**Abstract :** Thermal barrier coatings (TBCs) serve as thermal barriers against the high temperature of the hot regions of the aircraft turbine engines keeping the surface of the turbine blades, vanes and combustion chamber at comparatively lower temperature. The life of these coatings depends on many in-service environmental factors. Among these factors, the behavior of the bond coat as well as the top coat at high temperature aggravated by the corrosive environments having S, V, Na and Cl plays a key role. The incorporation of the 5-15% CaZrO<sub>3</sub> in YSZ coatings was studied after hot corrosion in vanadium oxide environment. It was observed that the reactivity of the V gradually switched from Y to Ca making CaV<sub>2</sub>O<sub>4</sub> instead of YVO<sub>4</sub>; the percentage of CaV<sub>2</sub>O<sub>4</sub> increased with the increase of CaZrO<sub>3</sub> in YSZ. It eventually prevented leaching out of the Y from YSZ leaving the YSZ without any harmful phase change. The thermal insulation was found to be improved in case of CaZrO<sub>3</sub> incorporated YSZ coatings as compared to only YSZ coating.

**Keywords :** hot corrosion, thermal barrier coatings, yttria stabilized zirconia, calcium zirconate

**Conference Title :** ICMMSE 2015 : International Conference on Mechanics, Materials Science and Engineering

**Conference Location :** Istanbul, Türkiye

**Conference Dates :** September 28-29, 2015