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Comparative study of the sintering behaviors between YSZ and LZ/YSZ composite

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Abstract

Sintering behaviors of YSZ and 30LZ were studied in this paper. LZ and YSZ were found to have a good chemical compatibility that no obviously changes in the amount of LZ after sintered at 1473 K for 200 h and La-rich area keeps pyrochlore structure after sintered 1673 K for 24 h. The sintering resistance of YSZ was improved by the addition of LZ that the shrinkage of 30LZ were lower than YSZ at whole sintering temperature. However, TEC of YSZ will decrease if LZ was added into YSZ which is because LZ has lower TEC than YSZ.

Key words: TBCs, YSZ, LZ, sintering ability, thermal expansion coefficient.

1. Introduction

Yttria partial stabilized zirconia (YSZ) is widely used in thermal barrier coatings (TBCs) and solid oxide fuel cells (SOFCs) [1-3]. TBCs are widely used as thermal insulation applications which include substrate, bond coat and ceramic coat. As thermal barrier coatings, YSZ has a low thermal conductivity, high thermal expansion coefficient (TEC) and a good thermal cycling life. All these properties make YSZ most successful material for TBCs. However, low sintering resistance and phase unstable limit the operating temperature to lower than 1473 K. Although good permeability of oxygen is well used as

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