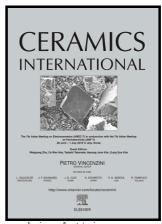
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Phase structure and thermal conductivities of Er₂O₃ stabilized ZrO₂

toughened Gd₂Zr₂O₇ ceramics for thermal barrier coatings

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Abstract

3.5 mol% Er₂O₃ stabilized ZrO₂ (ErSZ) and Gd₂Zr₂O₇ powders were produced by a

chemical co-precipitation and calcination method, and ErSZ was used to toughen

Gd₂Zr₂O₇. The phase structure, toughness and thermal conductivities of ErSZ

toughened Gd₂Zr₂O₇ ceramics were investigated. When the ErSZ content was below

15 mol%, the compound consisted of pyrochlore phase, the ordering degree of which

decreased with the increase of the ErSZ content. High ErSZ doping led to the

formation of metastable tetragonal (t') phase in the compound. The addition of ErSZ

in Gd₂Zr₂O₇ benefited its toughness, mainly attributable to the presence of t' phase in

the compound. With the increase of the ErSZ content in the compound, the thermal

conductivity first decreased and then showed an upward tendency, and 10 mol% ErSZ

toughened Gd₂Zr₂O₇ exhibited the lowest thermal conductivity.

1

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