Study of non-transformable t’-YSZ by addition of niobia

Henriques; V.A.R.\textsuperscript{1}; Cairo, C.A.A.\textsuperscript{1}; Almeida, D.S.\textsuperscript{1}, Saldaña, J.M.\textsuperscript{2}, Piorino Neto, F.\textsuperscript{1}

\textsuperscript{1}Divisão de Materiais - Instituto de Aeronáutica e Espaço (AMR/IAE/CTA), Brazil
\textsuperscript{2}Centro de Investigacion y de Estudios Avanzados (CINVESTAV), Querétaro, Mexico

Materials containing tetragonal zirconia are promising for structural applications because of their stress assisted tetragonal-to-monoclinic transformation near room temperature allied with their potential for ferroelastic domain switching at high temperatures. The target of this work was the obtainment of tetragonal zirconia polycrystalline (TZP) with high density, from mixtures of high purity powders of zirconia, yttria and niobia. Samples were produced by mixing of initial powders followed by uniaxial and cold isostatic pressing with subsequent densification by sintering in air. The samples were characterized for phase composition, microstructure and mechanical properties by X-ray diffraction, scanning and transmission electron microscopy and nanoindentation measurements, respectively. The results presented evidences of ferroelasticity mechanism. This mechanism would justify the high toughness of these zirconias, paving the way for the development of new materials for application in TBC for gas turbine blades.

Keywords: zirconia, TZP, ferroelasticity, nanoindentation.

Work supported by CNPq (process number: 490845/2006-1).


vinicius@iae.cta.br, Rua Heitor de Andrade, n. 1604, Jd. das Indústrias, São José dos Campos-SP, CEP:12241-000.