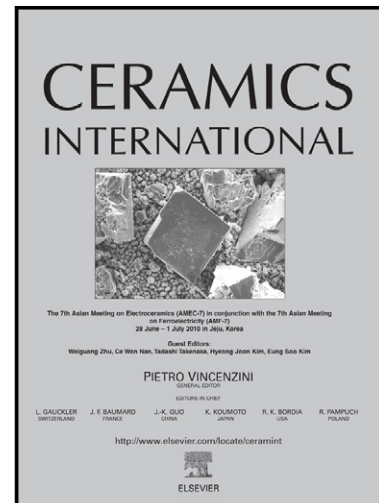


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# Comparison of Microstructure and Mechanical Properties of Plasma-sprayed Nanostructured and Conventional Yttria Stabilized Zirconia Thermal Barrier Coatings

Reza Ghasemi<sup>a,\*</sup>, Reza Shoja-Razavi<sup>a</sup>, Reza Mozafarinia<sup>a</sup>, Hossein Jamali<sup>a</sup>

<sup>a</sup>*Department of Materials Engineering, Malek-Ashtar University of Technology, Shahinshahr, Isfahan, Iran.*

*\*Corresponding author. Tel.: +983125225041. Fax: +983125228530.*

*E-mail address: r\_ghasemi@mut-es.ac.ir (Reza Ghasemi).*

## Abstract

The main goal of this paper was to evaluate and compare the microstructure and mechanical properties of plasma-sprayed nanostructured and conventional yttria stabilized zirconia (YSZ) thermal barrier coatings (TBCs). To this end, NiCrAlY bond coat, nanostructured, and conventional YSZ coatings were deposited on Inconel 738LC substrate by atmospheric plasma spraying (APS). The mechanical properties of the coating were evaluated using nanoindentation and bonding strength tests. The microstructure and phase composition of the coating were characterized by field emission scanning electron microscopy (FESEM) and X-ray diffractometry (XRD). The nanostructured YSZ coating contained both nanosized particles retained from the powder and microcolumnar grains formed through the resolidification of the molten part of the powder, whereas the microstructure of conventional YSZ coating consisted of columnar grain splats only. The phase composition of as-sprayed nanostructured coating consisted of the non-transformable tetragonal phase, while the conventional coating showed the presence of both the monoclinic and non-transformable tetragonal phases.

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