

New Structural Heterogeneous Ceramic

Title: New structural heterogeneous ceramic materials for severe conditions of service

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Support: JECS Trust; Contract #201597. Budget: 4720 Euros.

Abstract:

The aim of the nano indentation work is to elucidate whether the contribution of each phase to the hardness and elastic modulus of $\text{CaZrO}_3\text{-MgO-ZrO}_2$ composites can be estimated on the basis of simple “rule of mixtures” or there are other parameters to take into account as the grain size and grain boundary. The principal conclusion of the indentation tests in $\text{CaZrO}_3\text{-MgO}$ ceramic multiphase composites was the dependence between global (macro scale) and individual (nano scale) properties. The correction methods due the elastic recovery, comparison between Berkovich and Vickers tests and influence of porosity, allow good reliability to estimate the residual indent after unloading. The values obtained for the single phases are good agreement with the literature, where the hardness and Young’s modulus of each individual (local) phase of CaZrO_3 , MgO and $c\text{-ZrO}_2$ are very similar and are independent of the two microstructures studied.

A paper has been published in top 1 journal of materials science/ceramic:
<https://doi.org/10.1016/j.jeurceramsoc.2017.11.007>