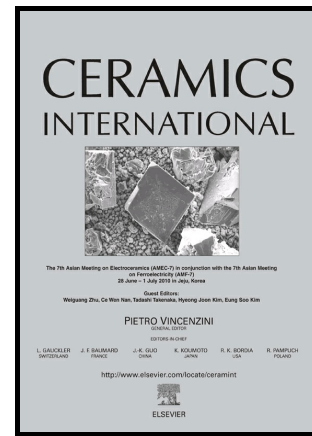


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Analyses of Young's modulus and thermal expansion coefficient of sintered porous alumina compacts

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Abstract

This paper reports the derivation of Young's modulus (E) and thermal expansion coefficient (TEC, β) for a sintered porous structure with open pores. The theoretical E is affected by the number of grains and the grain boundary area in sintered ceramics. The measured E -porosity relationship for porous alumina compacts were compared with the theoretical E values that were derived for the present open-pore structure and also for the dispersed (closed)-pore structure treated previously. With decreasing porosity (50% \rightarrow 10%), the scattered E values showed a gradually increasing tendency, which were located between two theoretical curves for the open-pore structure. The sudden increase of E values in the porosity range from 10% to 0% was well explained by the theoretical dependence of E on porosity for the open- or closed-pore structure. The β values for the porous alumina structures were independent of porosity and close to the β values reported for fully dense alumina compacts. This result was in accordance with the

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