The Effect of Dolomite Addition onto the Phases and Hardness of Zirconia Toughened Alumina

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Abstract

Zirconia toughened alumina (ZTA) is one of the composite ceramics that are widely use in load bearing and wear resistant applications. The composite is known for their good hardness and toughness, due to the presence of both Al2O3 and yttria stabilized zirconia (YSZ). The enhance toughness for ZTA are mostly originated from the presence of YSZ in the composite. The phase transformation from tetragonal to monoclinic that happen inside of YSZ during the presence of stress and increase its toughness. Thus, the amount of tetragonal and monoclinic phase inside of YSZ are critital to its toughness. In this research, the amount of dolomite was varied from 0 to 1.0 wt % while ratio of Al2O3 to YSZ were fixed to 4: 1. The sample were prepared through the solid-state sintering method. XRD was done onto the sample to analyze the phases. XRD analysis shows that no presence of new compound in ZTA system. With addition 0.3 wt% of dolomite, Vickers hardness reached maximum of 1842.75HV.

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