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## Effect of $\text{LiAl}_5\text{O}_8$ additions on the sintering and optical transparency of LiAlON

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### Abstract

$\text{LiAl}_5\text{O}_8$  (zeta alumina) was reaction sintered with  $\alpha\text{-Al}_2\text{O}_3$  and AlN to produce  $\gamma\text{-LiAlON}$ . Zeta alumina transforms from a primitive to a face-centered cubic structure above 1290 °C with a lattice parameter similar to  $\gamma\text{-AlON}$ . Weight loss measurements combined with XRD suggest solubility of Li in the spinel structure at elevated temperatures. The Vickers hardness, at a 1-kg load, of the pressureless sintered LiAlON was  $16.5 \pm 0.5$  GPa, independent of the grain size or amount of zeta alumina added, for  $\text{LiAl}_5\text{O}_8$  additions ranging between 0 and 16 wt.%. In-line transmission in the visible and near-IR regions increased with increasing grain size, most likely due to pore coalescence.

**Keywords:** AlON; Sintering; Transparency; LiAlON;  $\text{LiAl}_5\text{O}_8$

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