

## INCREASE IN HARDNESS FOR FLASH SINTERED CERAMICS

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A study of the hardness values of flash sintered multiphase ceramics was carried out to determine the effect of flash sintering on mechanical property. A three-phase ceramic of equal volume percent of  $\text{Al}_2\text{O}_3$ ,  $\text{MgAl}_2\text{O}_4$ , and 8YSZ was compared to single phase  $\text{Al}_2\text{O}_3$ ,  $\text{MgAl}_2\text{O}_4$ , and 8YSZ. Samples were flash sintered with an isothermal furnace temperature of  $1450^\circ\text{C}$ , a field of  $680\text{ V/cm}$ , and a current limit set to  $50\text{mA/mm}^2$ . Control samples were made by conventional sintering and two-step sinter forging. Vickers hardness tests were conducted to evaluate hardness as a function of process parameters. Initial results reveal an increase of hardness for flash sintered samples compared to conventionally sintered and two-step sinter-forged samples. The two-step sinter-forged samples and flash sintered three-phase samples had similar grain sizes and density, and the increase in hardness is hypothesized to be a result of increase point defects resulting from flash sintering.

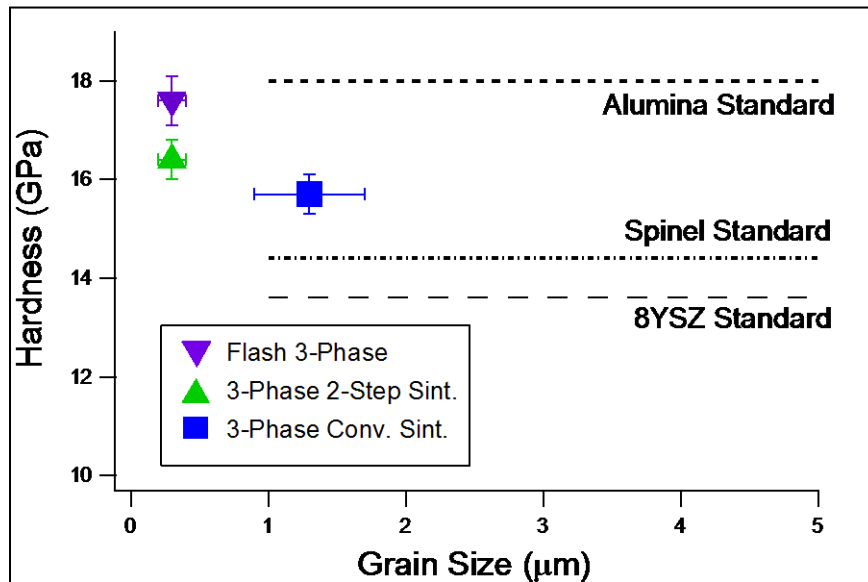


Figure 1 – Hardness values of flash versus conventionally sintered samples