

Evaluation of grain boundary plane distribution in yttria stabilized polycrystalline zirconia based on 3D EBSD analysis

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In this work we have investigated grain boundary plane distributions in the yttria stabilized zirconia samples sintered at 1450, 1500 and 1550°C for 2h. Since all our samples were sintered in different thermal conditions, they also differ significantly as far as microstructure is concerned. Average grain sizes vary from $2.22 \pm 0.08 \mu\text{m}$ to $4.11 \pm 0.18 \mu\text{m}$ depending on the sintering temperature. The question whether these differences have an impact on the GBP distributions needs to be answered. In the stabilized zirconia samples sintered at the temperature of 1450°C and 1500°C boundaries having (001) planes in one of the grains were over-represented. The evidence for over-representation of such boundaries in the zirconia ceramics sintered at 1550 °C is apparently too weak. The frequencies of occurrence of twist, symmetric, and 180°-tilt boundaries in zirconia were estimated for ceramic material for the first time. It must be underlined that all distributions were obtained directly from the 3D EBSD measurements.

[1] P.Bobrowski, M.Faryna & K.Głowiński (2016) *Mater. Charact.* **122**, 137.

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