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Sintering by diffusion promoting grain growth of yttria doped Co304

Sintering is a phenomenon driven by diffusion. As such, the energy required to move an atom or ion from one position to another, the activation energy, is fundamental in understanding sintering. In this work, the activation energy of densification and the activation energy of grain growth of 8·mol% yttria with 0.0, 0.5, 1.0, and 2.5·mol% Co_3O_4 were estimated from two-stage sintering experiments where sample length change was measured with dilatometry, and grain size was measured with scanning electron microscopy images. Sintering performance, and dopant effects on crystal structure, as measured by XRD, are presented. Activation energy estimates were then used to empirically estimate, and identify with curve-fitting the unknown function of density from the Wang and Raj activation energy equation; a literature standard in the estimation energy of activation energy of diffusion.

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