FLASH SINTERING OF CERAMIC FILMS: THE INFLUENCE OF SURFACE TO VOLUME RATIO

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To establish the effect of sample thickness on the flash onset, we measure the sintering behavior of thin and thick films of 3 mol% yttria, the following is noted. (i) The onset of flash moves to a higher value for the thinner specimens. (ii) The power transition falls within a narrow band when the power is normalized with respect to surface rather than volume. (iii) Sintering of thinner specimens require a higher current density limit. These results point to a deeper significance of black body radiation than its use in estimating the specimen temperature in a steady state of flash.

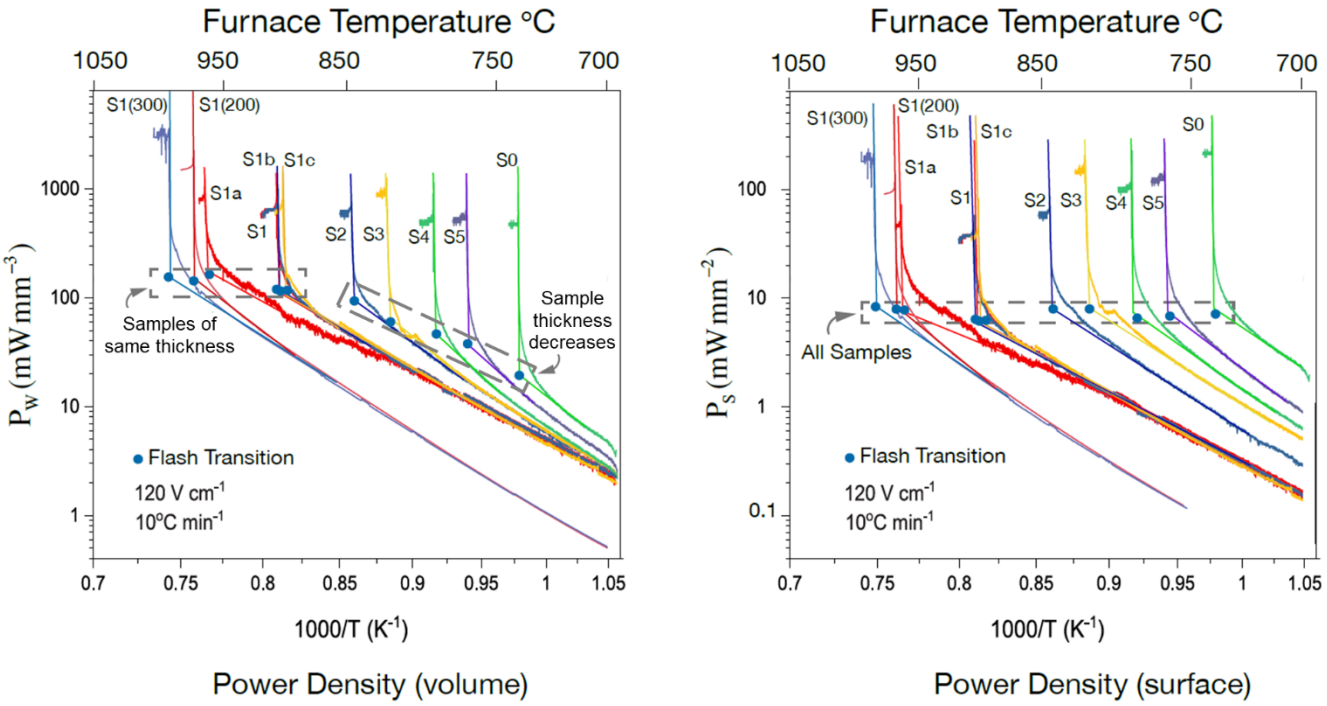

Figure 1 – Arrhenius plots of power for specimens with variable thickness, normalized respect to volume (left) and surface (right).