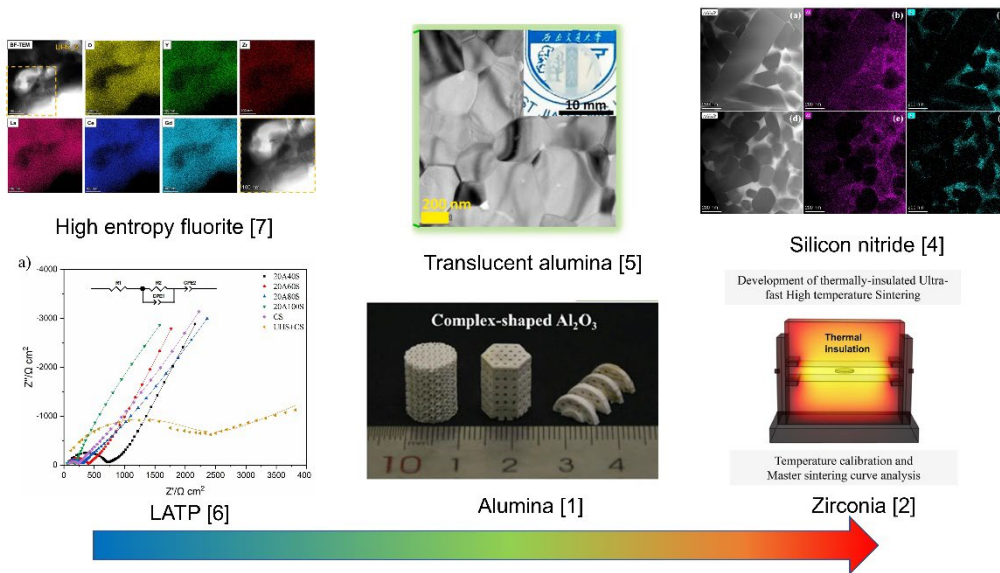


ULTRAFAST HIGH-TEMPERATURE SINTERING OF ADVANCED CERAMICS: A DIRECT COMPARISON WITH THE STATE-OF-THE-ART TECHNIQUES

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Ultrafast High-temperature Sintering (UHS) allows consolidation of ceramics in just a few tens of seconds. The green body is placed within a heater energized by the Joule effect at temperatures up to 3000 °C. The accelerated UHS thermo-kinetics induces unique far from equilibrium features. UHS clearly opens up novel opportunities in ceramics consolidation as it combines together ultrarapid firing cycles and ultrahigh temperatures. The talk summarizes recent upgrades of the UHS experimental setup in order to consolidate large parts [1] while using less energy [2] and avoiding undesired carbon contamination [3]. A direct comparison with conventional sintering confirms the “favorable” impact of accelerated heating and cooling rates in terms of i) dramatic (up to 95%) reduction in energy consumed during the sintering process [4] ii) straightforward processing of transparent ceramics without need for external pressure and/or reducing atmosphere (i.e., hydrogen) [5] iii) suppressed volatilization of light elements [6] iv) enhanced sinter-activity in high entropy oxides [7].



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