Contribution ID: **79** Type: **3. Oral presentation**

Microstructure and mechanical properties of photonic sintered silver doped yttria stabilized zirconia

Monday, 31 August 2026 15:00 (20 minutes)

Photonic sintering is a promising alternative to conventional furnace sintering, offering extremely high heating rates and significantly reduced processing times. The process relies on high-intensity light irradiation to directly couple energy into the surface of ceramic powder compacts, enabling rapid heating and densification. In this work, photonic sintering of silver-containing 3 mol% yttria-stabilized zirconia (3Y-TZP) was investigated using short-wavelength laser irradiation. The small silver addition was used to improve optical absorption and enable efficient coupling of the laser energy into the ceramic powder compact. Cylindrical green bodies were sintered at peak temperatures between 1225 ℃ and 1550 ℃ with dwell times as short as 30 s and compared to conventionally sintered reference samples.
Rapid densification behavior, microstructural evolution, and mechanical performance were systematically investigated as a function of sintering temperature and dwell time. In addition, the temporal evolution of laser power during sintering was analyzed to gain insight into the dynamic laser–material interaction. The role of silver redistribution and evaporation, as well as transient thermal gradients across the sample thickness and their influence on local microstructural development, was also investigated.

Professional Status of the Speaker

Doctoral or Master Student

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

Author: TEUCHER, Carsten (IKMT Universität Stuttgart)

Co-authors: Prof. KERN, Frank (IKMT Universität Stuttgart); Mr EBERT, Julian (IKMT Universität Stuttgart); Prof. RHEINHEIMER, Wolfgang (IKMT Universität Stuttgart)

Presenter: TEUCHER, Carsten (IKMT Universität Stuttgart)

Session Classification: Photonic sintering

Track Classification: Group 3: Photonic sintering