

COUPLING 3D PRINTING WITH FAST/SPS SINTERING: AN APPROACH TOWARDS FAST PROTOTYPING OF METALLIC COMPONENTS

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In recent years, metal binder jetting has emerged as one of the most promising and efficient technologies for the additive manufacturing of small metal components in mass production, offering a cost-effective and environmentally friendly alternative to other powder-based AM methods, such as L-PBF (Laser Powder Bed Fusion). Despite its high productivity, one of its main limitations is the need for a standalone sintering step, which impacts processing time and energy consumption. Accelerated sintering strategies, such as FAST/SPS, may offer a viable means of shortening processing times; however, the capabilities of this approach for binder-jetted materials and geometries remain under thorough investigation. In this work, we analyze 17-4PH components produced via a metal binder jetting system (Shop System by Desktop Metal) and investigate the potential of combining binder jetting with FAST/SPS sintering for the rapid prototyping of metallic components. Both pressureless and pseudo-isostatic sintering of the green object have been investigated. In the second case, an inert pressure-transfer powder has been used to maintain the green-body geometry. The influence of the various parameters involved in the printing and sintering process have been investigated. In all cases, the use of FAST/SPS reduces the time required for debinding and sintering, enabling the production of fully sintered samples in considerably less time than conventional sintering.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

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Invitation letter for visa

No

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