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Development of Sintering Methods for Near Net Shaping of Copper by Selective Powder Deposition

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In the current day industry laser based Additive Manufacturing (AM) of metals is a well-established production technique. Its main limitation, linked to inherent the rapid melting and solidification, is the narrow range of compatible materials. In comparison, sintering based AM offer a potentially much larger library to select from, including many of the traditional Powder Metallurgical materials. Most commercially available solutions are based on binder jetting, material extrusion and stereolithography. These, however, all share the same disadvantage in the need to remove binder prior to consolidation by sintering. This can limit the applicable range of obtainable geometries, instilling a strong preference for thin-walled parts.
Previously the use of Selective Powder Deposition (SPD) combined with sintering was proposed as an alternative AM method avoiding the need for debinding. In SPD multiple powders can be stacked in a layerwise manner to form a 3D powder construct. If one of these powders is an inert non-sintering material, then in theory parts, mono- or multi-material, can be obtained via heat treatment of this powder construct. In this, the sintering is the crucial step determining both material properties and geometrical accuracy.
In the current work we present an extensive study into the densification of copper parts obtained via the SPD route. The influence of several sintering methods, atmospheres and thermal cycles are examined in relation to material properties.

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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