

## BINDER JETTING OF METALLIC COMPONENTS USING HIERARCHAL BINDERS

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In this research a novel approach of rapidly manufacturing high-quality metallic parts, by additive manufacturing has been developed. Current binder jet technology has limitations in fabricating parts with sufficiently high-densities. This is due to the use of organic binders which subsequently need to be burnt out, resulting in components that are intrinsically porous and weak. In this work, we have developed a series of hierachal metallic binders that do not need to be removed and form part of the overall build material. The metallic binders also act as in situ infiltration and improve overall part densities and structural integrity. The binders contain metallic particles ranging from molecular to micron size. In this work the effect of metallic binders on shrinkage, porosity and tensile strength have been assessed. The ability to manufacture parts with lower porosity and therefore improved tolerances and performance will enable a greater variety of industries to adopt additive manufacturing technology.

### Biography

Kate Black has received her PhD in Material Science from the University of Liverpool in 2008. She then went on to join the University of Cambridge as a Research Associate, in the Centre for Advance Photonic and Electronics, principally working on the development of novel materials for supercapacitors. She is now serving as a Senior Lecturer in the Centre for Materials and Structures at the University of Liverpool, School of Engineering. Her research interests are primarily focused on the development of novel functional materials, using inkjet and binder jet printing. Her main area of expertise is in the development of novel reactive organo-metallic inks (ROM) that can be exploited to produce a wide a variety of functional materials, such as conductors, insulators and semiconductors. She was voted as Top 50 women in Engineering by WES in 2018 and is a Board Member of the Young Academy of Europe.

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