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Advanced Materials and Structures for High Temperature Applications (4)

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INNOVATIVE SUPERALLOY POWDER DESIGNED FOR ADDITIVE MANUFACTURING AND
FOR HIGH TEMPERATURE USE UP TO 900C**Abstract**

To reduce mass, energy use and costs of rocket engines and components for the space industry, the combination of Additive Manufacturing with innovative high temperature materials now offers a great opportunity to reach these goals. Aubert Duval, in partnership with Alloyed in UK have developed for these demanding applications a new powder alloy ABD®-900AM, offering high mechanical properties for components operating at high temperature and specifically designed for powder bed fusion process. ABD®-900AM is an age-hardenable nickel-based superalloy offering high temperature tensile strength, with a working temperature range up to 900C (1652F) in its age-hardened state. Compared to alloy 718, ABD®-900AM not only offers a higher operating temperature but also significant long-term stability using the same printing parameters. Besides the alloy has an excellent creep strength – similar to cast 939 and 738 alloys – while having a superior resistance to cracking during manufacture and heat treatment, enabling complex part design. Designed to be free of solidification, liquidation, and strain-age cracks, ABD®-900AM showcases exceptional printability for a 40% γ' -phase strengthened alloy. Materials performance and case studies will be presented.