



Poster 8

The University of Manchester



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## Understanding cold work needed for recrystallization of 316L LPBF material and its effect on the material's performance in PWR primary water

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**ABSTRACT:**

University 316L austenitic Stainless Steel (SS) is used within the structural components and main circuits of Pressurized Water Reactors (PWR) due to its good corrosion resistance and machinability. Due to Additive Manufacturing's (AM) benefits of more complex geometries and shorter manufacturing times, there is a need to understand AM material's performance within PWR primary water environments. Laser Powder Bed Fusion (LPBF) is a specific type of AM that allows for the more complex geometries through melting layers of powder metal together. Previous research has shown LPBF 316L SS has slower recrystallization kinetics leading to partial recrystallization, creating an anisotropic microstructure that can lead to reduced mechanical and corrosion performances therefore different levels of induced cold work (0%, 5%, 7%, and 10%) and solution annealing temperatures (1000°C, 1050°C, 1100°C), were evaluated, and their subsequent mechanical and corrosion performances tested to determine the most beneficial microstructure.



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