

Non-destructive characterization of Al alloys produced by additive manufacturing using correlative tomography

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Parts produced by additive manufacturing are increasingly widely used and envisaged in various applications, including aerospace and aeronautics. However they can suffer from intrinsic fabrication defects (lack-of-fusion, keyholes, gas pores,...), as well as in-use damage. Avoiding the replacement of damaged parts through a healing mechanism is of great interest.

Designing self-healing Al alloys is challenging because it requires appropriate temperature conditions, which can trigger the diffusion and/or local melting process of the healing agent. Proper understanding of the healing mechanism, followed by the healing treatment optimisation depends on a successful microstructural analysis performed at the exact location of a damage. Therefore, a multiresolution and multimodal imaging approach with a spatial resolution from micro- to nano- scale is required to evidence the microstructure healing efficiency.