

Mechanical properties assessment of additive manufactured Ti64 using Small Punch Test

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Small Punch Testing (SPT) methods were developed in the early 1980's. It has been mainly driven in nuclear power industry in order to test very small specimens. The technique uses disk-shaped specimens of 10 mm diameter and 0.5 mm thick on which a puncher applies a force. It is used for determination of tensile properties and creep properties (Small Punch Creep SPC) [1]. We will present results on the mechanical properties characterization of the titanium alloy Ti64 tested by SPT and SPC. These methods are particularly suited to the study of materials obtained by additive manufacturing for testing orientation and thickness effects. Therefore, we will compare the mechanical behavior of the Ti64 alloy elaborated by laser powder bed fusion and by more conventional methods.

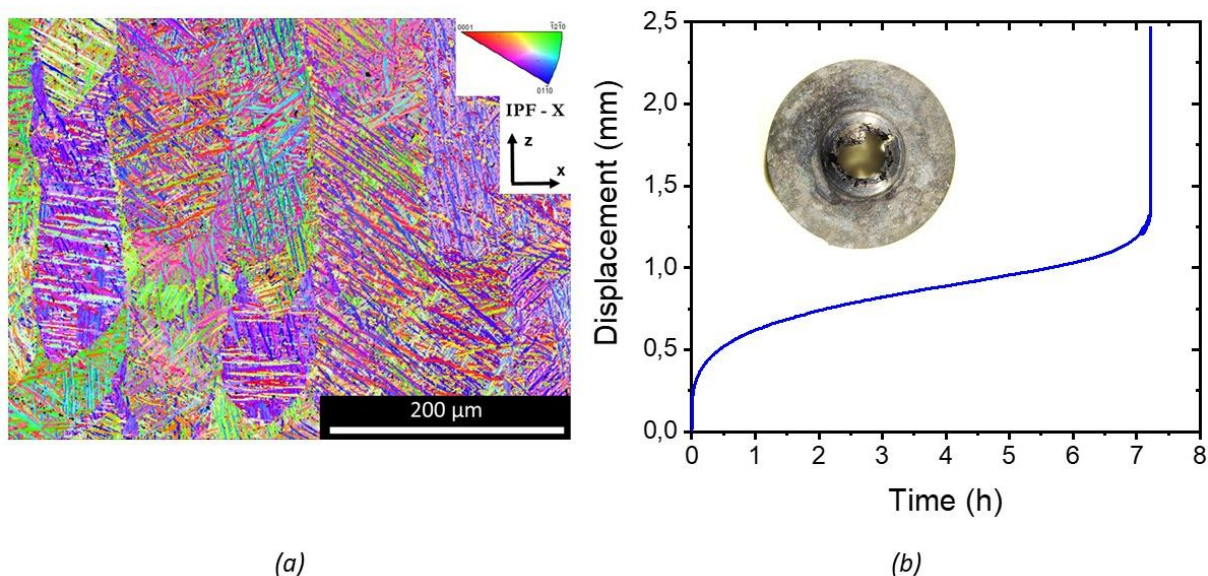


Figure 1: Microstructure (a) and SPCT curve (b) of additive manufactured Ti64. The creep test is performed at 500°C under 850N. The 10 mm diameter specimen after testing is shown as insert in (b).

Keywords: *Small Punch Test, Small Punch Creep Test, Ti64, Additive Manufacturing*

References:

- [1] M. Bruchhausen *et al.*, «European standard on small punch testing of metallic materials », *Am. Soc. Mech. Eng. Press. Vessels Pip. Div. Publ. PVP*, vol. 1A-2017, 2017