

Supplementary Material for:

Comparative quantitative analysis of the evolution of precipitates in Inconel 625 superalloy manufactured by laser powder bed fusion subjected to high-temperature creep and annealing

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Table S-1. Equivalent circular diameter ECD and shape factor SF of grains in stress-relieved Inconel 625 LPBF in the xz and xy planes together with values of their median M and d10, d50, d90

ECD						
plane	ECD range	ECD mean $\pm$ SD	ECD _M	ECD ₁₀	ECD ₅₀	ECD ₉₀
	[$\times 10^{-6}$ m]	[$\times 10^{-6}$ m]	[$\times 10^{-6}$ m]	[$\times 10^{-6}$ m]	[$\times 10^{-6}$ m]	[$\times 10^{-6}$ m]
xz	2-110	15 $\pm$ 13	10	14	38	73
xy	2-106	13 $\pm$ 14	8	5	41	81
SF						
plane	SF range	SF mean $\pm$ SD	SF _M	SF ₁₀	SF ₅₀	SF ₉₀
xz	1.00-17.80	3.83 $\pm$ 3.28	3.01	1.58	3.06	7.41
xy	1.01-16.90	2.53 $\pm$ 1.44	2.19	1.40	2.57	4.86

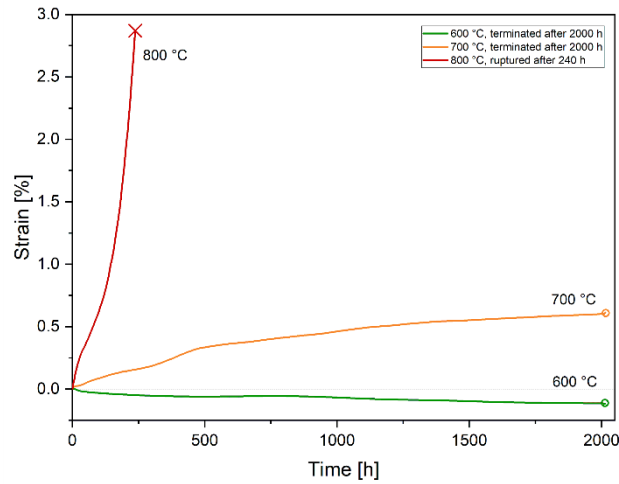


Fig. S-1. The strain vs. time creep curves of Inconel 625 LPBF tested at a temperature of 600 °C, 700 °C and 800 °C under uniaxial tensile stress of 100 MPa

Fig. S-1 shows the strain vs. creep time curves of Inconel 625 LPBF tested at 600, 700 and 800 °C under constant uniaxial stress of 100 MPa. During the creep test at 600 °C, a negative creep phenomenon was observed, while after 2000 h of the test, the overall creep strain was equal to -0.12 %. In turn, the creep test at 700 °C was terminated in the secondary creep stage. The steady-state stage started after 700 h of the test. When the test was terminated after 2000 h, the accumulated creep strain was equal to 0.6%, and the minimum creep rate was equal to $2.87 \times 10^{-10} \text{ s}^{-1}$. On the contrary, the test at 800 °C was finished after 240 h, when the rupture occurred. So, in the creep curves, all three stages might be distinguished. The accumulated strain was equal to 2.8%, while the creep rate in the secondary stage was equal to $1.18 \times 10^{-8} \text{ s}^{-1}$.

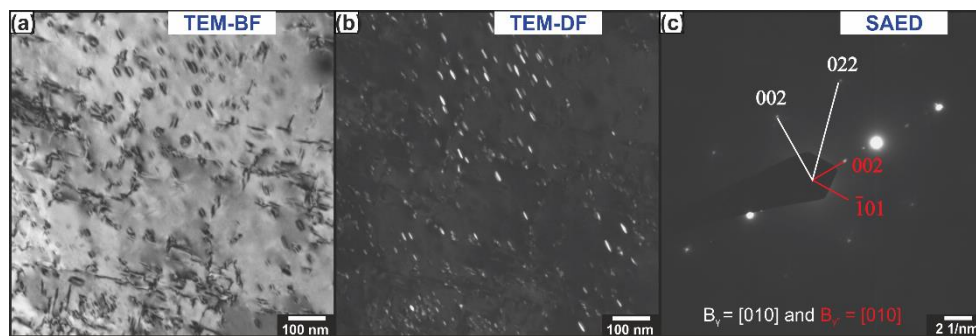


Fig. S-2. Microstructure of Inconel 625 LPBF creep tested at 600 °C: a) BF, b) DF TEM images showing the γ'' phase particles, c) corresponding SAED pattern with its solution