

Supplementary Materials for

Comparative analysis of structure and properties of Nb-B inoculated direct chill cast AA4032 alloy extruded from as-cast and homogenised conditions

Nilam S. Barekar^{1,2,*}, Ivan Skalicky^{2,3}, Shihao Wang¹, Pavel Shurkin¹, Onuh Adole¹, N. Hari Babu¹, Martin Jarrett^{2,4}

¹BCAST, Brunel University London, Uxbridge, UB8 3PH, United Kingdom

²Constellium University Technology Centre, Brunel University London, Uxbridge, UB8 3PH, United Kingdom

³Constellium Extrusions Decin s.r.o., Ustecka 37, 405 35 Decin V, Czech Republic

⁴Constellium UK Ltd, Grenville Court, Britwell Road, Burnham, Bucks SL1 8DF, United Kingdom

Supplementary Table 1. Calculated phase composition of the experimental alloy at 803 K with Mg ₂ Si phase and excluding Mg ₂ Si phase (in brackets)								
Phase	Q _M , wt. %	Q _V , vol. %	Concentrations, wt. %					
			Al	Si	Fe	Cu	Mg	Ni
(Al)	Balance	Balance	Balance	1.07 (1.07)	<0.01	0.48 (0.48)	0.63 (0.76)	<0.01
Al ₃ Ni	0.64 (0.63)	0.43 (0.43)	Balance	0	0	0	0	41.96 (41.96)
(Si)	9.81(9.87)	11.05 (11.11)	0	100	0	0	0	0
Al ₃ CuNi	2.14 (2.16)	1.16 (1.17)	Balance	1.62 (1.64)	<0.01	30.09 (30.04)	0.11 (0.13)	29.39 (29.41)
Al ₁₈ Fe ₂ Mg ₇ Si ₁₀	4.49 (4.50)	4.22 (4.22)	Balance	26.79 (26.79)	10.65 (10.65)	0	16.23 (16.23)	0
Mg ₂ Si	0.17 (0.00)	0.23 (0.00)	0	36.62 (-)	0	0	63.38 (-)	0

Supplementary Table 2. Calculated phase composition of the solid solution at 448 K obtained with and without Mg ₂ Si (Refer to Table 1)				
Phase	Extruded from homogenised billet		Extruded from non-homogenised billet	
	Q _M , wt. %	Q _V , vol. %	Q _M , wt. %	Q _V , vol. %
(Al)	97.45	97.44	97.2	97.2
Q-AlCuMgSi	2.01	1.95	2.32	2.24
Al ₂ Cu	0.013	<0.01	0	0
Mg ₂ Si	0	0	0.05	0.07
(Si)	0.52	0.60	0.42	0.48