

Supplementary Information

Magnetic and Mechanical Properties of Additively Manufactured $\text{Al}_x(\text{CoFeNi})$ Complex Concentrated Alloys

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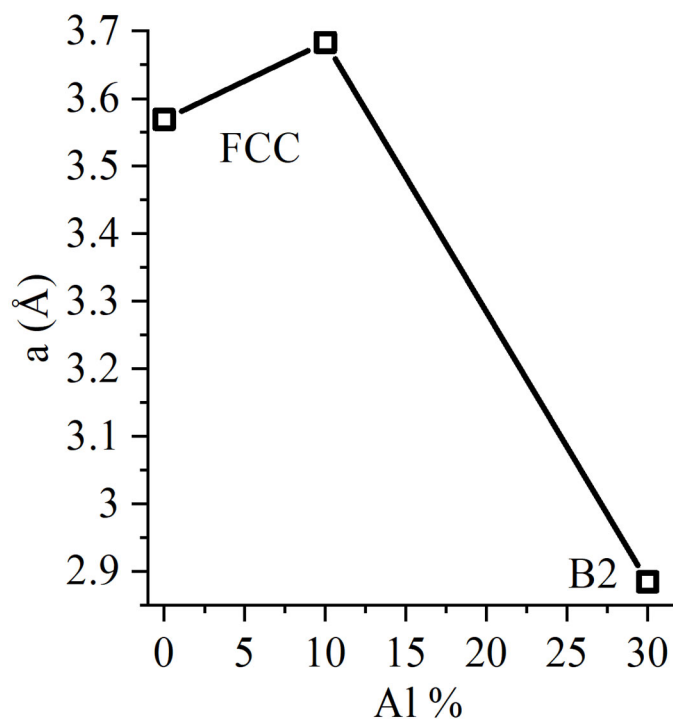


Figure S1. Change in lattice parameters with increasing Al content in $\text{Al}_x(\text{CoFeNi})$.

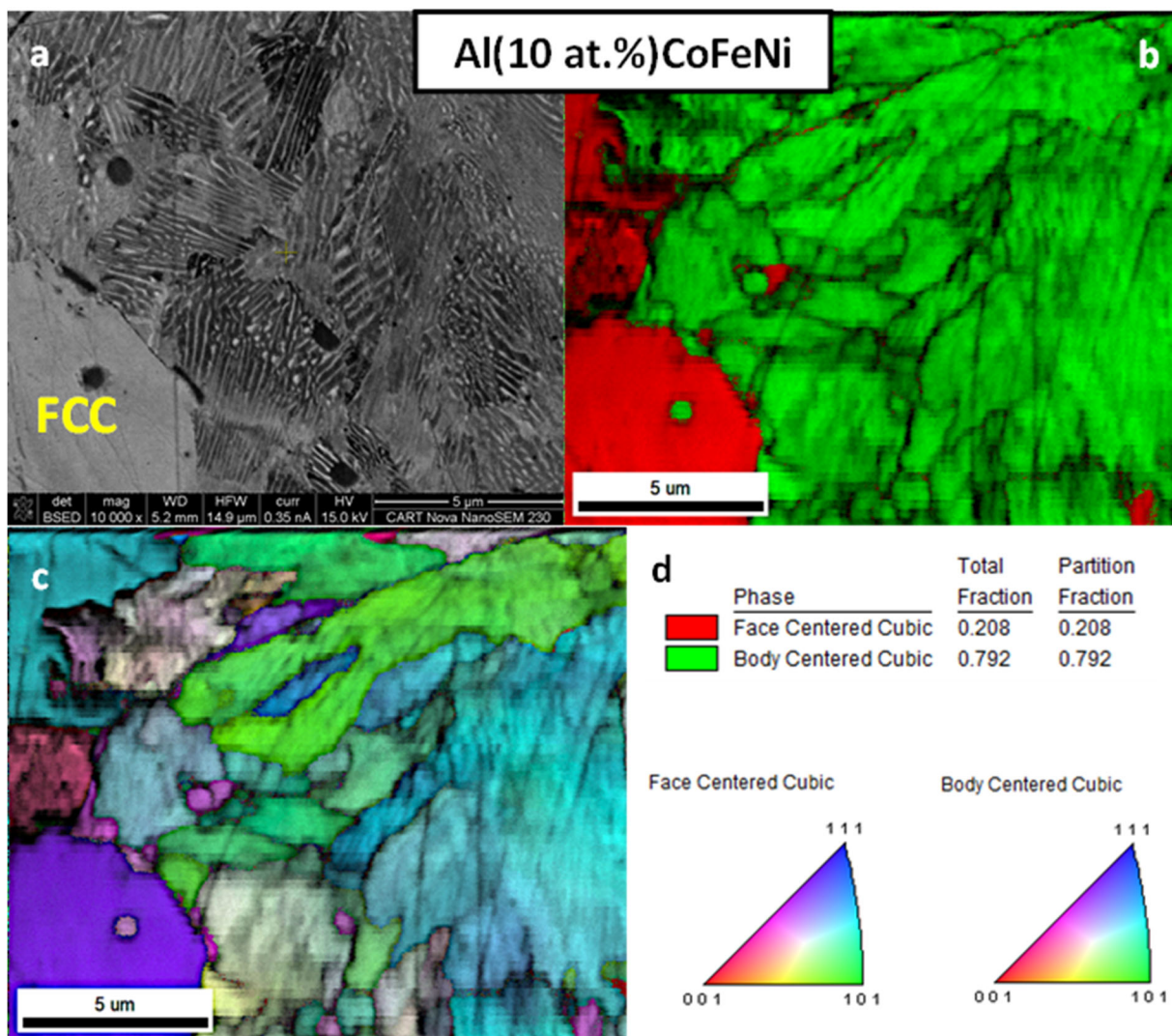


Figure S2. (a) The backscattered SEM image along with (b) Phase and (c) IPF maps obtained from the EBSD scans performed on the Al-10 condition after MT. Legend for phase and IPF maps are given in (d).

Phase compositions in the three alloys

No phase transformations occurred in CoFeNi and Al₃₀(CoFeNi) and thus, the composition of the FCC and B2 phases in CoFeNi, and Al₃₀(CoFeNi) respectively before and after M-T is the same. While a solid-state reaction occurred in Al₁₀(CoFeNi) during M-T, the composition of the phases post M-T can only be determined using Atom Probe Tomography (APT) due to their fine-scale. This is beyond the scope of the current study. But for qualitative comparison, the authors have included the following table which shows the composition of FCC, L1₂, BCC and

B2 phases after annealing the arc melted Al_{9.4}(CoFeNi) alloy at 600°C for 50hrs. This annealing treatment also produced a similar nano-lamellar microstructure with four phases, as described by Dasari et.al. [1].

Table S1: Composition of FCC, L₁₂, BCC and B2 phases after annealing the arc melted Al_{9.4}(CoFeNi) alloy at 600°C for 50hrs

Composition		FCC	L ₁₂	BCC	B2
Al	at. %	5.83	22.90	4.03	30.36
	sigma %	0.14	0.28	0.10	0.25
Co	at. %	29.81	5.19	44.72	11.13
	sigma %	0.34	0.12	0.38	0.14
Fe	at. %	29.94	5.41	47.37	9.81
	sigma %	0.34	0.13	0.39	0.13
Ni	at. %	34.42	66.50	3.87	48.70
	sigma %	0.37	0.56	0.09	0.34

References:

- [1] S. Dasari, B. Gwalani, A. Jagetia, V. Soni, S. Gorsse, R. Banerjee, Hierarchical Eutectoid Nano-lamellar Decomposition in an Al_{0.3}CoFeNi Complex Concentrated Alloy, Sci. Rep. 10 (2020) 4836. <https://doi.org/10.1038/s41598-020-61538-6>.