metals

Supplementary materials

Copper-Tantalum Metal Matrix Composites Consolidated from Powder Blends by Severe Plastic Deformation

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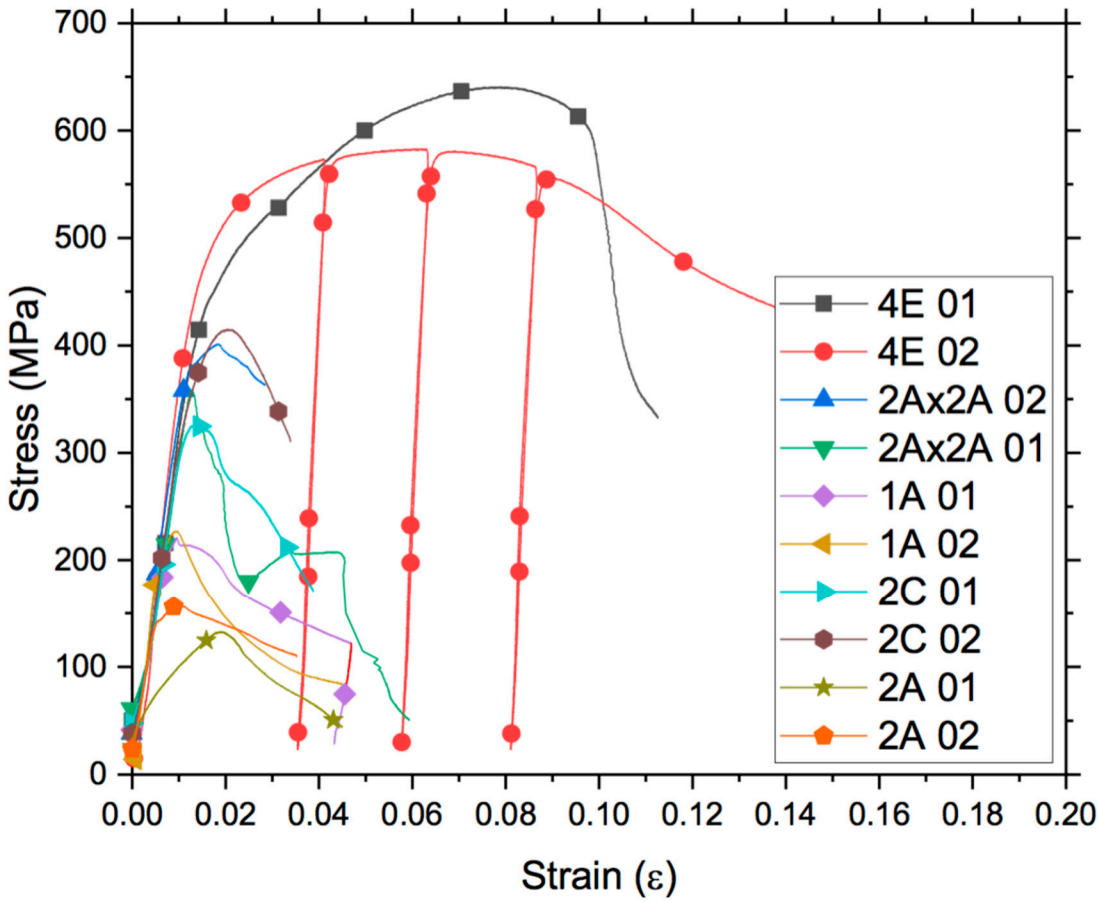

Figure S1. Experimental compression stress-strain curves for Cu-Ta material processed at ambient temperature.

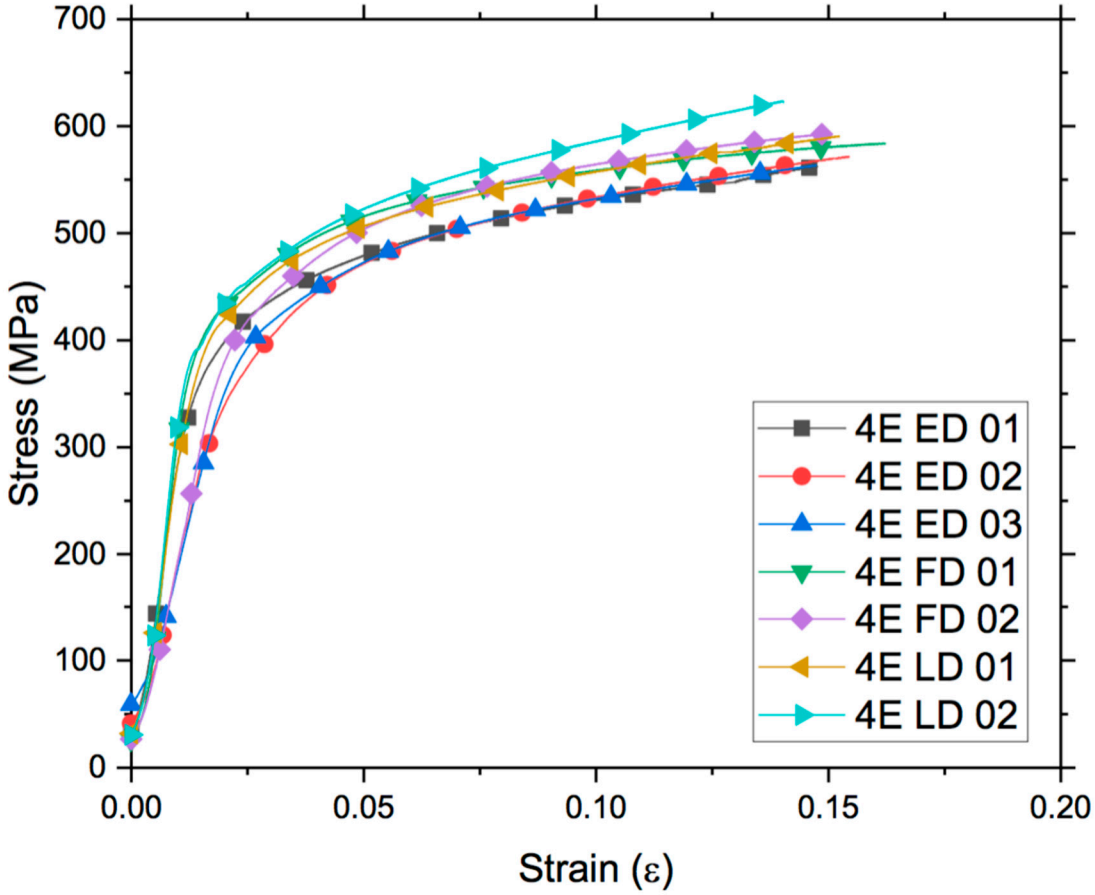

Figure S2. Experimental compression stress-strain curves along the ED, FD, and LD for Cu-Ta material processed by route 4E at 300°C.

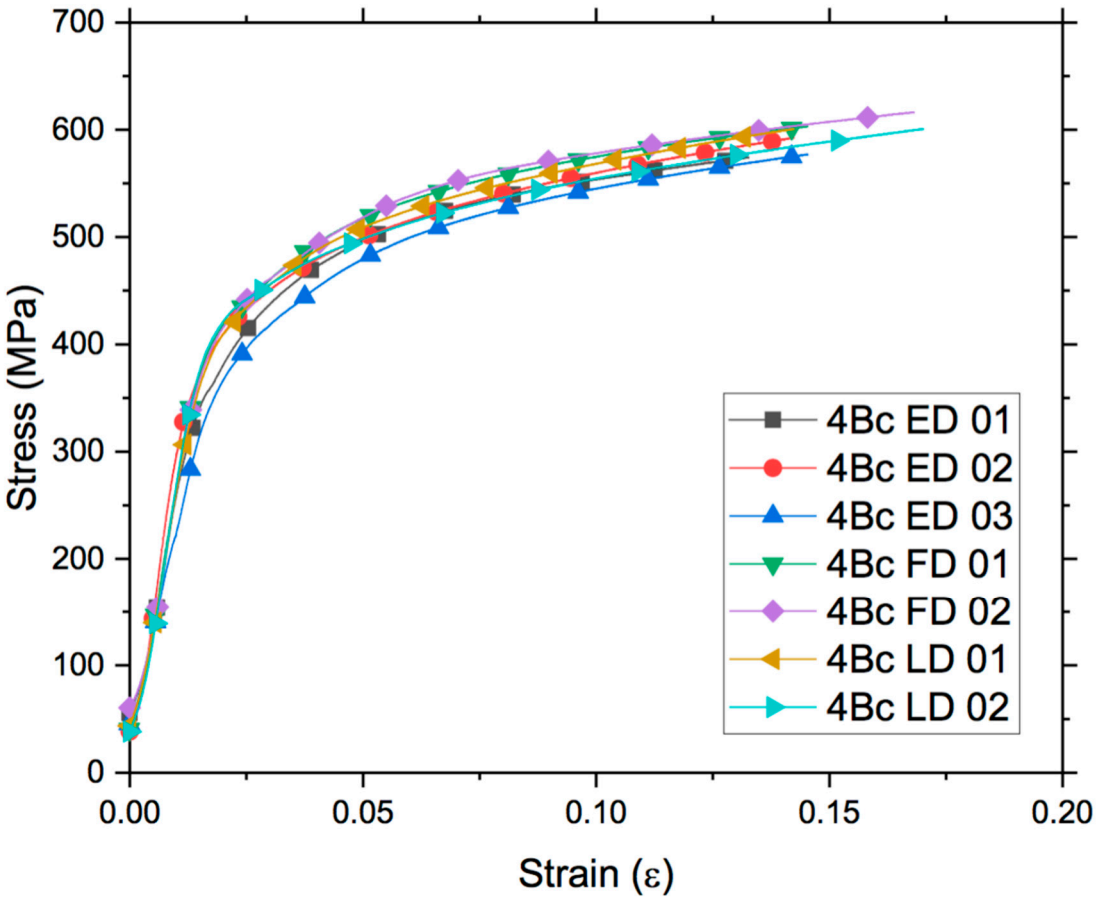

Figure S3. Experimental compression stress-strain curves along the ED, FD, and LD for Cu-Ta material processed by route 4Bc at 300°C.

Table S1. Summary of Young's modulus data measured from stress-strain curves.

Sample ID	Processing Temp C	Orientation	Strain Rate s-1	Loading Young's Modulus (MPa)	Standard Error (MPa)	Unloading Young's Modulus (MPa)	Standard Error (MPa)
1A_01	24	ED	10^{-3}	39031.88	69.95		
2A_01	24	ED	10^{-3}	24709.14	52.68	26104.36	118.87
2C_01	24	ED	10^{-3}	30892.84	25.11	84258.93	164.90
2Ax2A_01	24	ED	10^{-3}	32839.98	44.22	67388.27	89.43
4E_01	24	ED	10^{-3}				
Cycle 1	24	ED	10^{-3}	38802.29	71.40	101107.94	111.68
Cycle 2	24	ED	10^{-3}	90182.71	108.05	98817.09	95.77
Cycle 3	24	ED	10^{-3}	88719.59	130.92	97642.74	92.82
Cycle 4	24	ED	10^{-3}	71532.88	156.54	81688.95	101.97
1A_02	24	ED	10^{-3}	25091.70	19.86		
2A_02	24	ED	10^{-3}	4722.45	8.66		
2C_02	24	ED	10^{-3}	31204.20	30.61		
2Ax2A_02	24	ED	10^{-3}	28949.69	20.76		
4E_02	24	ED	10^{-3}	33195.94	34.75		
4E ED 01	300	ED	10^{-3}	30002.37	35.92	151079.55	805.03
4E ED 02	300	ED	10^{-3}	20933.72	16.29	186699.55	604.24

4E ED 03	300	ED	10^{-3}	17886.75	6.62	128372.47	115.65
4E ED 10^-2	300	ED	10^{-2}	31874.54	124.50	130082.29	213.72
4E ED 10^-1	300	ED	10^{-1}	26174.95	661.24	100148.21	301.74
4E FD 01	300	FD	10^{-3}	40144.35	31.02	103346.88	233.92
4E FD 02	300	FD	10^{-3}	21612.27	8.92	124337.63	143.31
4E LD 01	300	LD	10^{-3}	33131.28	24.12	141899.63	178.90
4E LD 02	300	LD	10^{-3}	39831.25	32.50	126943.05	244.98
4Bc ED 01	300	ED	10^{-3}	25873.85	26.91	129297.75	145.11
4Bc ED 02	300	ED	10^{-3}	32287.01	40.28	133241.46	175.36
4Bc ED 03	300	ED	10^{-3}	31821.92	26.70	150643.03	746.83
4Bc ED 04	300	ED	10^{-3}	19291.29	14.93	138381.02	176.69
4Bc ED 10^-2	300	ED	10^{-2}	29014.79	64.34	123626.62	217.14
4Bc ED 10^-1	300	ED	10^{-1}	32015.04	594.40	130588.40	206.83
4Bc FD 01	300	FD	10^{-3}	38324.90	38.60	149767.03	198.38
4Bc FD 02	300	FD	10^{-3}	27784.20	21.54	123088.81	121.50
4Bc LD 01	300	LD	10^{-3}	26174.89	15.85	126255.81	210.35
4Bc LD 02	300	LD	10^{-3}	28790.05	14.94	105831.81	237.15