

Synthesis of a Metal Oxide by Forming Solvate Eutectic Mixtures and Study of Their Synthetic Performance under Hyper- and Hypo-Eutectic Conditions

Molar ratio Ammonium compounds/metal nitrates	Ammonium Nitrate (%)	Ammonium Acetate (%)	Ammonium Formate (%)	Ammonium Carbonate (%)	Ammonium Bicarbonate (%)	Raw materials (%)
20:1	56.53	57.73	62.26	42.04	46.02	68.89
17:1	65.449	73.45	35.86	50.73	52.23	68.89
14:1	79.2	57.25	26.26	40.23	24.99	68.89
11:1	58.38	62.81	40.95	66.19	37.97	68.89
8:1	71.569	57.8	17.18	54.93	48.98	68.89
5:1	80.367	51.09	22.08	49.9	40.2	68.89
3:1	62.243	66.61	13.04	49.61	50.94	68.89
1:1	50.62	66.84	25.75	43.1	39.42	68.89
1:3	45.78	74.29	71.34	48	8.37	68.89
1:5	56.781	70.89	71.02	60.92	8.17	68.89
1:8	75.68	71.57	68.26	64.83	7.1	68.89
1:11	76.814	63.16	57.2	66.07	8.82	68.89
1:14	50.7	62.05	54.54	68.16	7.04	68.89
1:17	15.49	54.46	71.62	50.95	6.73	68.89
1:20	28.677	70.55	63.32	32.43	6.38	68.89

Table S1. Tabulated data of the maximum percentage of the superconductive phase obtained via the synthesis using different ammonium containing compounds vs metal nitrates. Percentages were obtained via Rietveld refinement.

Molar ratio Ammonium compounds/metal nitrates	Ammonium Nitrate (%)	TetramethylAmmoniumNitrate (%)
20:1	56.53	56.44
17:1	65.449	35.69
14:1	79.2	61.52
11:1	58.38	91.2
8:1	71.569	71.94
5:1	80.367	95.73
3:1	62.243	75.08
1:1	50.62	73.9
1:3	45.78	70.45
1:5	56.781	66.19
1:8	75.68	71.23
1:11	76.814	73.89
1:14	50.7	77.09
1:17	15.49	77.7
1:20	28.677	83.12

Table S2. Tabulated data of the maximum percentage of the superconductive phase obtained via the synthesis using different ammonium and tetramethyl ammonium containing compounds vs metal nitrates. Percentages were obtained via Rietveld refinement.

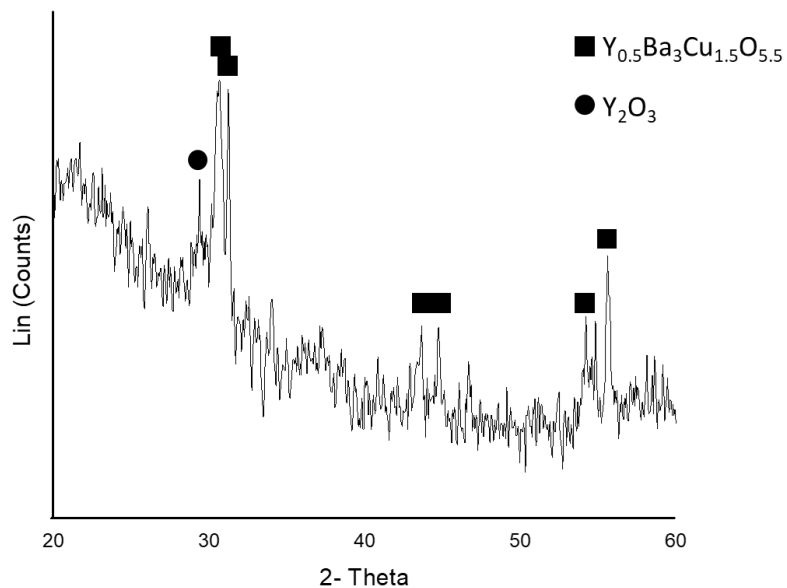


Figure S1. Powder diffraction pattern of the synthesis of YBCO (123) superconductor via 5:1 molar ratio of ammonium nitrate/metal nitrates under neutral atmosphere (Ar) at a max temperature of 620 °C.

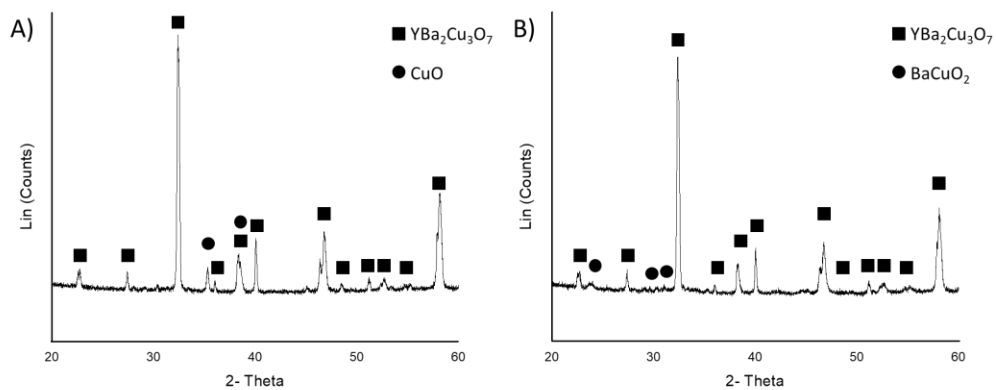


Figure S2. Powder diffraction patterns of the synthesis of YBCO (123) superconductor via 5:1 molar ratios of A) ammonium nitrate/metal nitrates, and B) tetramethyl ammonium nitrate/metal nitrates.

15196	Ba(CO ₃)
27449	Ba(CO ₃)
63257	Ba(CO ₃)
1049	BaCuO ₂
65801	BaCuO ₂
89232	BaCu ₃ O ₄
89105	Ba ₂ Cu _{2.89} O ₆
68217	Ba ₂ CuO ₃
35495	Ba(NO ₃) ₂
91439	Ba _{0.97} CuO ₂
26961	BaO
69757	CuO
16025	CuO
24013	NH ₄ NO ₃
27772	Y ₂ O ₃
33648	Y ₂ O ₃
202877	Y ₂ Cu ₂ O ₅
171703	YCuO _{2.5}
56507	YBa ₂ Cu ₃ O ₇
32707	Y ₂ BaCuO ₅
65550	Y _{0.5} Ba ₃ Cu _{1.5} O _{5.5}
65549	Y _{0.25} BaCu _{0.75} O _{2.25}
65867	YBa ₄ Cu ₃ O ₉

Table S3. ICSD numbers (left) with the corresponding crystal phases (right)

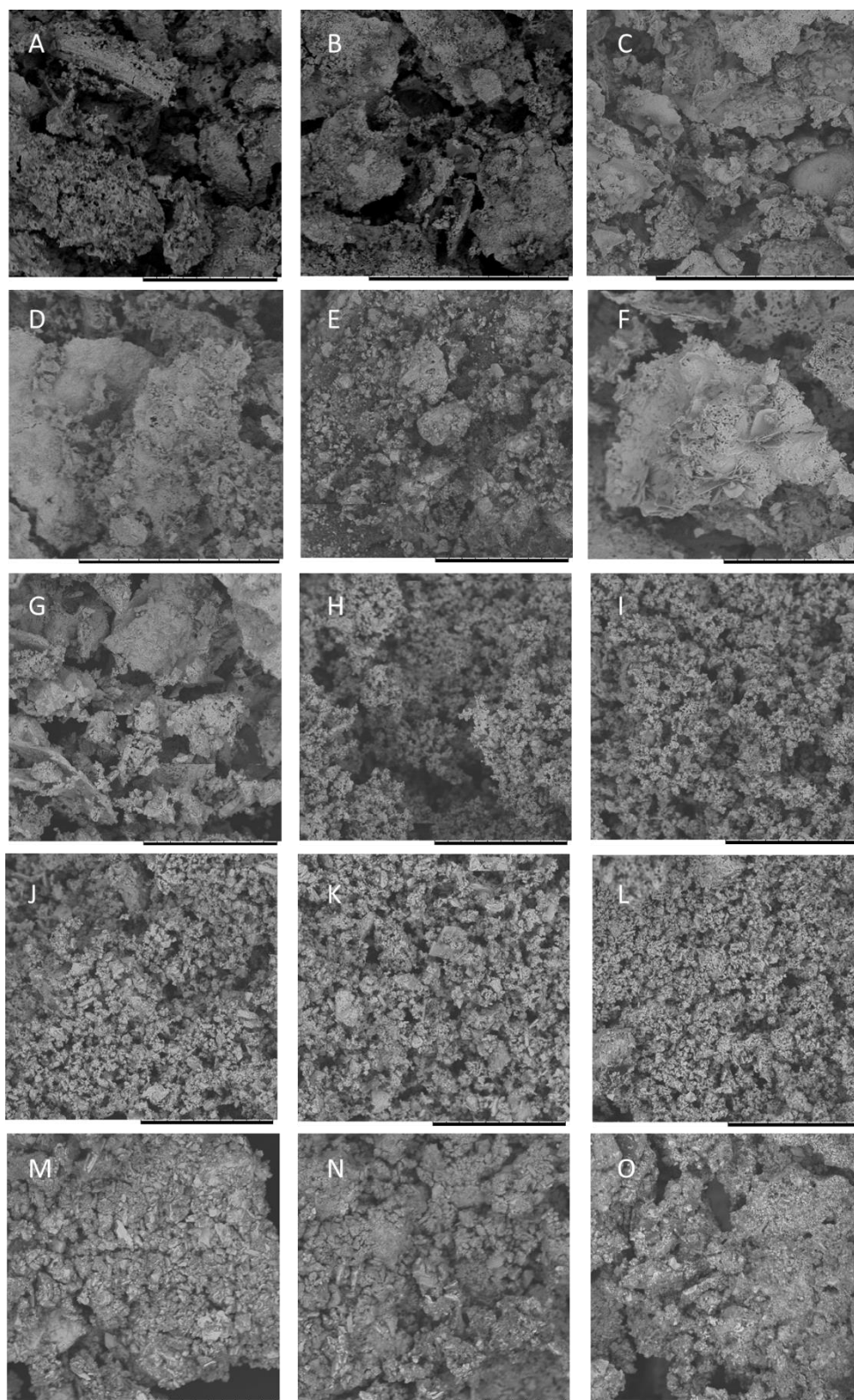


Figure S3. SEM images of the synthesis of YBCO superconductor with different molar ratios of tetramethyl ammonium nitrate/metal nitrates. A) 1:20, B) 1:17, C) 1:14, D) 1:11, E) 1:8, F) 1:5, G) 1:3, H) 1:1, I) 3:1, J) 5:1, K) 8:1, L) 11:1, M) 14:1, N) 17:1, O) 20:1 Scale Bar = 100 μm .