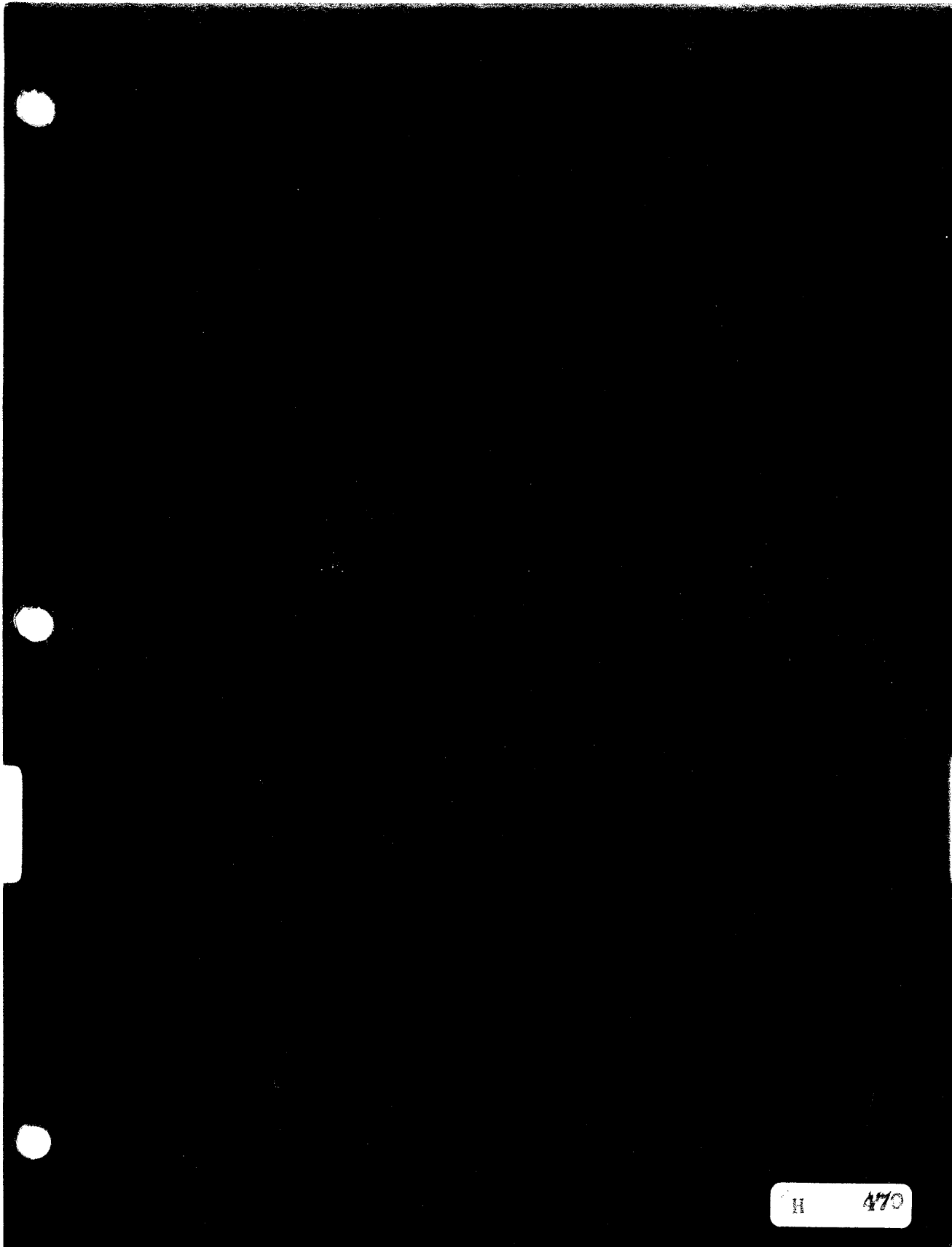


La-Ba-Cu-O 214

H

469

RLM0945



H 470

14471-479

La-Ba (sr) - end

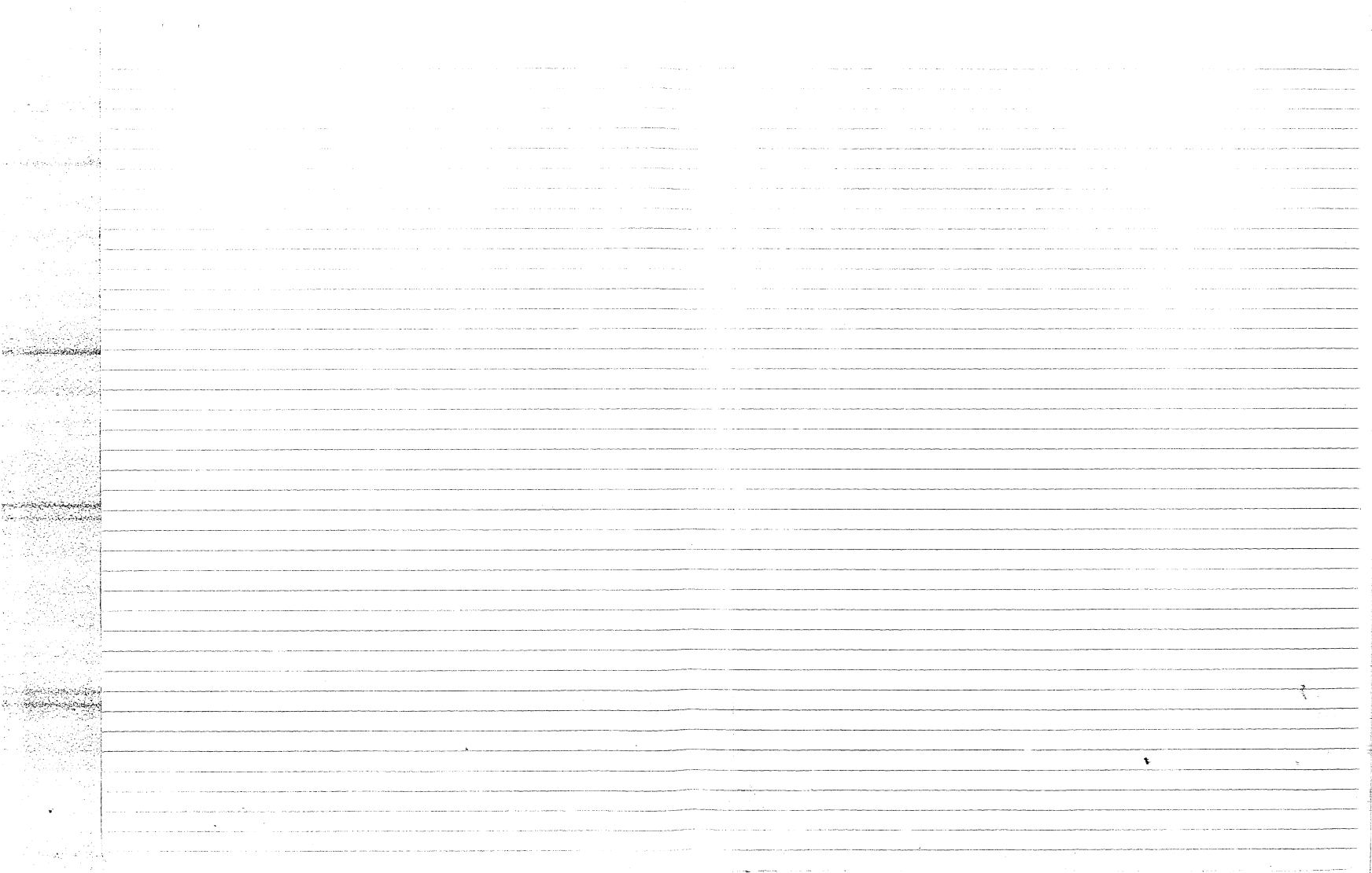
processing conditions and
results.

79252/1/6-19-1-4/10 14 DO NOT MARK
QADRI ET AL V. CHU
MASTER SET. BATES# H469 - H536.

RLM0947

No	Composition	First time			Second time			Third time			annealing - 1			annealing - 2			T _{c1}	T _{c2}	R-T	Ratio	P	X			
		T ^o	hrs	atm	T ^o	hrs	atm	T ^o	hrs	atm	T ^o	hrs	atm	T ^o	hrs	atm									
J-12	(La _{0.8} Ba _{0.2}) ₂ CuO ₄	900	4	Air P	900	8	Air P	925	24	Air	400	4	O ₂ 2000M	900	4	O ₂ 2000M									
J-13	(La _{0.95} Ba _{0.05}) ₂ CuO ₄	900	4	Air P	900	8	Air P	925	"	"	"	"	"	"	"	"									
J-14	(La _{0.9} Ba _{0.1}) ₂ CuO ₄	900	4	" P	"	"	" P	"	"	"	"	"	"	"	"	"	29	∞	M-i-s						
J-15	(La _{0.925} Ba _{0.075}) ₂ CuO ₄	900	4	Air P	900	8	Air P	925	24	Air															
J-16	(La _{0.9} Ba _{0.1}) ₂ CuO ₄	"	"	" P	"	"	" P	"	"	"	"	"	"	"	"	"									
J-17	(La _{0.925} Ba _{0.075}) ₂ CuO ₄	1100	26	Air P													32.7	21.7	M-i-s-i	1.33		109			
J-17-1	(La _{0.925} Ba _{0.075}) ₂	1100	26	Air P	950	4	Air										30.9	21.7	M-i-s-i	1.39					
J-17-2	La _{0.925} Ba _{0.075}	"	"	" P	"	"	2000M										41.2	19.2		2.03					
J-17-3	(La _{0.925} Ba _{0.075}) ₂ CuO ₄	1100	26	" P	400	2	Air										30.6	21.1		1.418					
J-17-4	"	"	"	" P	950	4	O ₂ 2000M	950	4	O ₂ 2000M															
J-17-5	"	"	"	" P	400	4	Air	250-400	4 hrs	400 keep	4 hrs						39.5	20		1.75					
J-18	(La _{0.9} Ba _{0.1}) ₂ CuO ₄	1100	30	Air P																			17.4		
J-19	(La _{0.95} Ba _{0.05}) ₂ CuO ₄	"	"	" P																				1.6	
J-20	La ₂ CuO ₄	1100	30	Air P																				0	
J-20-1	La ₂ CuO ₄	"	"	Air P	500	5	Vac																		
					1109.4 mg		1106.9 mg																		
J-21	(La _{0.925} Ba _{0.075}) ₂ CuO ₄	1100	30	Air P													36	23							
J-22	(La _{0.925} Ba _{0.075}) ₂ CuO ₄	1100	26	Air P																					17.4
J-22-1	"	"	"	" P	400	30'	O ₂ 2000M										40.9		I						
J-22-2-1	" less BaO ₂	"	"	"	250	12h	O ₂ 2000M												I						
J-22-2-2	" more "	"	"	"	"	"	O ₂ 2000M																		
J-22-No	"	"	"	" P	400	1h	O ₂ 2000M																		
J-23	(La _{0.925} Ba _{0.075}) ₂ CuO ₄	900	4	Air P	900	8	Air P																		5.4
J-23-1	"	"	"	"	"	"	"	400	5'	O ₂ 2000M															
J-23-2	"	"	"	"	"	"	"	"	"	O ₂ 2000M	900	5	O ₂ 2000M												
J-24	(La _{0.9} Ba _{0.1}) ₂ CuO ₄	1100	26	Air P																					
J-24-1	"	"	"	"	400	30'	O ₂ 2000M										34.5		I						
J-24-2-1	" less BaO ₂	"	"	"	250	12h	O ₂ 2000M																		
J-24-2-2	" more "	"	"	"	"	12h	O ₂ 2000M																		
J-24-2-No	"	"	"	"	400	1 hrs	O ₂ 2000M																		472

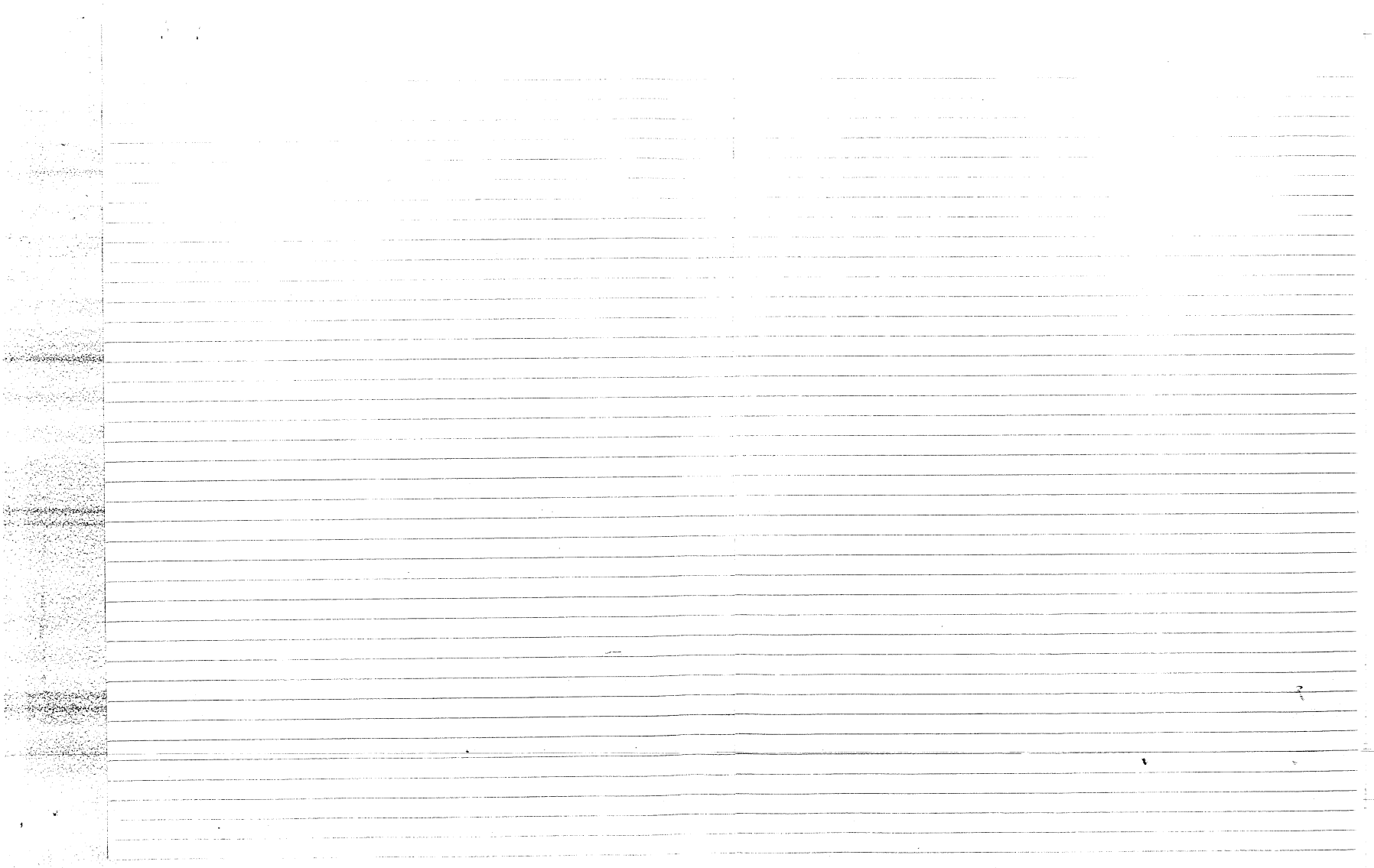
No	Composition	First time			Second time			Third time			Annealing - 1			Annealing - 2			T _{cd}	T _{cp}	R-T	Ratio	ρ	X
		T ^o	hrs	Atm	T ^o	hrs	Atm	T ^o	hrs	Atm	T ^o	hrs	Atm	T ^o	hrs	Atm						
J-25	(La _{0.9} Ba _{0.1}) ₂ CuO ₄	900	4	Air _p	900	8	Air _p														1.3	
J-26	J18-90% + SL-210%	1000 2:30pm																				
J-27	(Ba _{0.5} La _{0.5}) ₂ Cu ₂ O ₇	900	5	Air _p	900	32	Air _B									0	0				I	
J-27-1	(Ba _{0.5} La _{0.5}) ₂ Cu ₂ O ₇	900	5	Air _p	900	32	Air _B	400	1	O ₂ 2000M	900	3	O ₂ 2000M			0	0				I	
J-28	(Ba _{0.4} La _{0.6}) ₂ Cu ₂ O ₇	900	5	Air _p	900	32	Air _B									0	0				I	
J-28-1	(Ba _{0.4} La _{0.6}) ₂ Cu ₂ O ₇	900	5	Air _p	900	"	"	400	1	O ₂ 2000M	900	3	O ₂ 2000M			3.1	~4.2				I-S	
J-29	(Ba _{0.3} La _{0.7}) ₂ Cu ₂ O ₇	900	5	Air _p	900	32	Air _B									0	0				M	
J-29-1	(Ba _{0.3} La _{0.7}) ₂ Cu ₂ O ₇	900	5	Air _p	900	32	"	400	1	O ₂ 2000M	900	3	O ₂ 2000M			3	12	M-S	∞		M	
J-30	(Ba _{0.5} La _{0.5}) ₂ Cu ₂ O ₇	900	5	O ₂ 15M	900	32	Vac.									0	0				I red	
J-31	(Ba _{0.4} La _{0.6}) ₂ Cu ₂ O ₇	900	5	15M	900	32	Vac.									0	0				I red	
J-32	(Ba _{0.3} La _{0.7}) ₂ Cu ₂ O ₇	900	5	15M	900	32	Vac.									20				1.1	I	
J-33	(La _{0.9} Ba _{0.1}) ₂ CuO ₄	1100	26	Air _B	→780											<30	4.2					
J-34	(La _{0.95} Ba _{0.05}) ₂ CuO ₄	1100	26	Air _B	→780											~31.5K	~27.3K	M-S	∞			
J-35	(La _{0.5} Ba _{0.5}) ₂ Cu ₂ O ₇	900	24	O ₂ 2000M												30	8				M	
J-36	(La _{0.5} Ba _{0.5}) ₂ Cu ₂ O ₇	900	24	O ₂ 500M																		
J-37	(La _{0.5} Ba _{0.5}) ₂ Cu ₂ O ₇	1000	24	Air																		
J-38	(La _{0.5} Ba _{0.5}) ₂ Cu ₂ O ₇	700	12	O ₂ 150M																		
J-39	(La _{0.9} Ba _{0.1}) ₂ CuO ₄	700	12	Air	700	24	Air															
J-40	(La _{0.9} Ba _{0.1}) ₂ CuO ₄	700	12	Air	1150	24	Air															
J-40A	quench in N ₂															30	20			∞	M	
J-40A	quench in Air															30	15					
J-41	(La _{0.95} Ba _{0.05}) ₂ CuO ₄	1100	24	Air	quench in LN											30	22.9	M-S	∞		M	
J-41-1	"	"	"	"	"																	
J-42	(La _{0.95} Ba _{0.05}) ₂ CuO ₄	900	12	O ₂ 25M	1000	24	O ₂ 25M															
J-43	(Ba _{0.35} La _{0.65}) ₂ Cu ₂ O ₇																					
J-44	(Ba _{0.35} La _{0.65}) ₂ Cu ₂ O ₇																					
J-45	(La _{0.95} Ba _{0.05}) ₂ CuO ₄																					
J-46	(La _{0.9} Ba _{0.1}) ₂ CuO ₄	1100	24	Air _B																		
J-47	(La _{0.95} Ba _{0.05}) ₂ CuO ₄	1100	24	Air _B												27.3	9.8			M-I	15.6	
J-48	La ₂ CuO ₄	1100	24																			
J-49	(La _{0.95} Ba _{0.05}) ₂ CuO ₄	900		Air	900																	



No	Composition	First time			Second time			T ₁	T _L	R-T Ratio	p	X
		T _C	hrs	atm	T _C	hrs	atm					
J-50	(La _{0.9} Ba _{0.1}) ₂ LnO ₄	1100	24	Air	900	20	O ₂	30.3	16.0			
J-51	(La _{0.97} Ba _{0.03}) ₂ LnO ₄	1100	32	Air				24-25		M-I-S		
J-52	(La _{0.95} Ba _{0.05}) ₂ LnO ₄	1100	32	Air				Non		I		
XJ-53	(La _{0.45} Ba _{0.4}) ₂ LnO ₅	900 1100	24 32	O ₂ Air				30	6			
XJ-54	La _{0.5} Ba _{0.5} Ln _{0.5} O ₅	900 1100	24 32	O ₂ Air				8-10				
J-51-1	J-51	900	18	O ₂				36	11-12	M-S		
J-52-1	J-52	900	18	O ₂								
J-53-1	J-53	900	24	O ₂ 15m				34.5	19.2			
J-54-1	J-54	900	24	O ₂ 15m								
J-55	(La _{0.9} Ba _{0.1}) ₂ LnO ₄	1000	32	Air _p	1100	18	Air _B	< 30		M-I-S		
J-56	(La _{0.9} Ba _{0.1}) ₂ LnO ₄	1000	24	Air _p	1100	18	Air _B	35-1 20.8	17.9 20.4	M-S M-S		
J-57	La _{0.5} Ba _{0.5} Ln _{0.5} O ₅	900	24	O ₂ 15m								
J-58	La _{0.6} Ba _{0.4} Ln _{0.5} O ₅	900	24	O ₂ 15m								
J-56-1	J-56	1200						< 30 36.3		I-S M-S		
J-56-2	J-56	1150							20.4	M-S		
J-59	(La _{0.9} Ba _{0.1}) ₂ LnO ₄	1150	16	Air				30.3	15.8			
J-60	(La _{0.9} Ba _{0.1}) ₂ LnO ₄	1150	20	Air				30.3	15.6			
J-61	"	1150	24	Air				30.3	18			
J-62	"	"	36									
J-63	"	950	18	O ₂ 0.6								
J-64	J	950	18	O ₂ 0.6								

No	Composition	First time			Second time			Third time			Annealing-1			Annealing-2			T _{CD}	T _{CD}	R-T	Ratio	D	X
		T ^o C	hrs	atm	T ^o C	hrs	atm	T ^o C	hrs	atm	T ^o C	hrs	atm	T ^o C	hrs	atm						
SL-1	(La _{0.915} Sr _{0.085}) ₂ CuO ₄	1125	4	Air P	1100	22	Air P														0.1	
				transformer broke																		
SL-2	(La _{0.9} Sr _{0.1}) ₂ CuO ₄	1125	4	Air P	1100	22	Air P						45	28	M-S	00					16.9	
SL-3	(La _{0.85} Sr _{0.15}) ₂ CuO ₄	1125	4	Air P	1100	22	Air P						~39	Small	with A-S-H						0	
SL-4	(La _{0.85} Sr _{0.15}) ₂ CuO ₄	1125	4	Air P	1100	22	Air P														4.6	
SL-5	(La _{0.85} Sr _{0.15}) ₂ CuO ₄	1125	4	Air P	1100	22	Air P														5	
SL-6	(La _{0.9} Sr _{0.1}) ₂ CuO ₄	1110	24	Air B																		
	7 Jan																					
SL-7	(La _{0.925} Sr _{0.075}) ₂ CuO ₄	1100	30	Air B+D									39.4	18	M-S	00					M	
SL-8	(La _{0.9} Sr _{0.1}) ₂ CuO ₄	1100	30	Air B+D									~38	20	S-I	00						
SL-9	(La _{0.85} Sr _{0.15}) ₂ CuO ₄	1120	30	Air B+D									~39	20	A-1.4.2							
SL-10	(La _{0.9} Sr _{0.1}) ₂ CuO ₄	1100	24	Air									36	23	M-S	00					M	
SL-10-1	(La _{0.9} Sr _{0.1}) ₂ CuO ₄	1100	24	Air																		
SL-11	(La _{0.85} Sr _{0.15}) ₂ CuO ₄	1100	24	Air B									35	22.3	M-S							
SL-12	(La _{0.9} Sr _{0.1}) ₂ CuO ₄	1100	24	Air B																		
SL-13	(La _{0.9} Sr _{0.1}) ₂ CuO ₄	1000	8	Air P	1100	24	Air B						33	4	I-						40	
CL-1	(La _{0.9} Ca _{0.1}) ₂ CuO ₄	1100	24	Air B	1100	14	Air B						30	1.65							M	
CL-2	"	1000	8	Air P	1100	14	Air B															
CeS-1	(Ce _{0.9} Sr _{0.1}) ₂ CuO ₄																					
CeS-2	(Ce _{0.85} Sr _{0.15}) ₂ CuO ₄																					
CeS-3																						
CaB-1	(Ca _{0.9} Ba _{0.1}) ₂ CuO ₄																					
CaB-2	(Ca _{0.85} Ba _{0.15}) ₂ CuO ₄																					
ML-1	(La _{0.9} Mg _{0.1}) ₂ CuO ₄	1100	24	Air B																		
PL-1	(La _{0.9} Pb _{0.1}) ₂ CuO ₄	1100	24	Air B																		
Ys-1	(Y _{0.9} Sr _{0.1}) ₂ CuO ₄	1100	24	Air B																	I	
		1100	6h	→ 20	→ 1100°C																	
YB-1	(Y _{0.9} Ba _{0.1}) ₂ CuO ₄	1100	24	Air B																	I	
		1100	6h	→ 20	→ 1100°C																	
LuS-1	(Lu _{0.9} Sr _{0.1}) ₂ CuO ₄	1100	24	Air B																	I	
		1100	6h	→ 20	→ 1100°C																	
LuB-1	(Lu _{0.9} Ba _{0.1}) ₂ CuO ₄	1100	24	Air B																	I	
		1100	6h	→ 20	→ 1100°C																	

NO.	Compos. Tm	First			second time			T ₁	T ₂	R-T	Ratio	P	X
		T	hours	Atm	T	hours	Atm						
SL-18	SL ₂	900	20	O ₂									
SL-19	(La _{0.9} Sr _{0.1}) ₂ CoO ₄	1100	24	Air	900	20	O ₂						
SL-20	(La _{0.95} Sr _{0.05}) ₂ CoO ₄	1100	24	Air	900	20	O ₂						
SL-21	(La _{0.95} Sr _{0.05}) ₂ CoO ₄	1100	24	Air				36.2	26.6	M			
SL-22	La _{0.95} Sr _{0.05} Co _{0.5} O ₅	900	20	O ₂ 15m				39.2	32	M			
SL-23	La _{0.6} Sr _{0.4} Co _{0.5} O ₅	900	24	O ₂ 15m				40.6	32.7				
SL-23-1	SL-22	900	24	O ₂				42.5	30.3	M			
SL-23-1	SL-23	900	24	O ₂ 15m				44.5	31.5				
SL-20-1	SL-20	900	18	O ₂									
SL-21-1	SL-21	900	18	O ₂				38.8	19.8				
SL-24	(La _{0.9} Sr _{0.1}) ₂ CoO ₄	1000	24	Air _p	1100	18	Air _p						single crystal
SL-25	(La _{0.95} Sr _{0.05}) ₂ CoO ₄	1000	24	Air _p	1100	18	Air _p						
SL-26	La _{0.6} Sr _{0.4} Co _{0.5} O ₅	900	24	O ₂ 15m									
SL-27	La _{0.5} Sr _{0.5} Co _{0.5} O ₅	900	24	O ₂ 15m									
SL-24-1	SL-24	1150	24	Air									
SL-24-1	SL-24	1200	18	Air									
SL-28	(La _{0.9} Sr _{0.1}) ₂ CoO ₄	950	18	O ₂									
SL-29	(La _{0.9} Sr _{0.1}) ₂ CoO ₄	1150	16	Air				37	27.3				
SL-30	"	1150	20	"				36.3	27.3				H 477
SL-31	"	1150	24	Air				36.3	27.3				(SL-32 - 36)



SL-33

SL-29

1050

10

OL
2000u

SL-34

(L₂₀₀ S₀₁) m04

1050

18

OL
2000u

La Ba Sr Ca

H 480

RLM0959

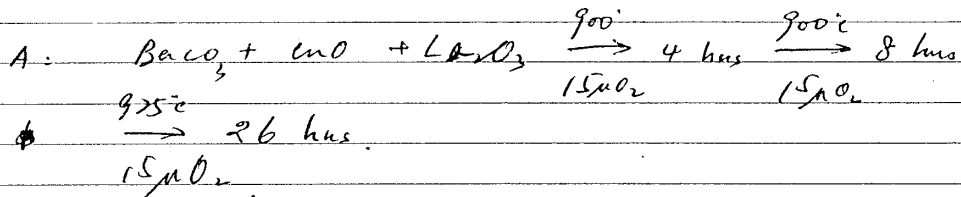
$$1 \text{ bar} = 750.06 \text{ Torr (mm)}$$

$$0.2 \times 10^{-4} \text{ bar} = 0.015 \text{ Torr} = 15 \text{ m Torr}$$

$$0.2 \times 10^{-4} \text{ bar} = 0.2 \times 10^{-4} \times 760 \text{ mm} = 152 \times 10^{-4} \times 10^3 \mu = 15 \mu$$

(I) $\text{Ba}_{0.75} \text{La}_{4.25} \text{Cu}_5 \text{O}_5 (z-y)$

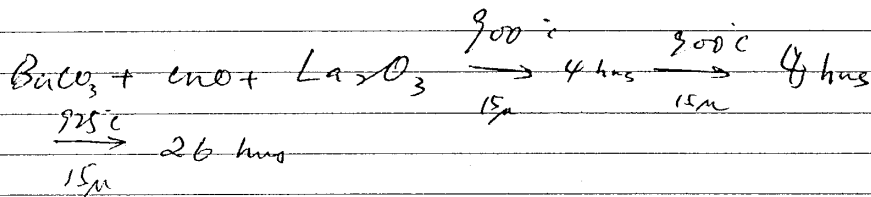
Ba $\text{La}_5 \text{Cu}_5 \text{O}_5$



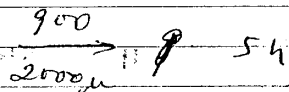
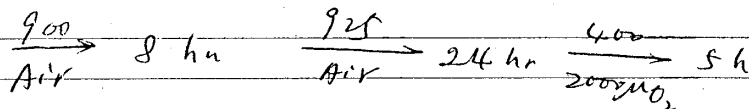
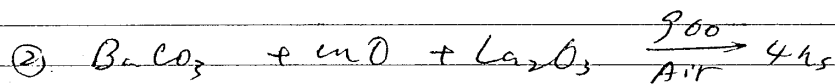
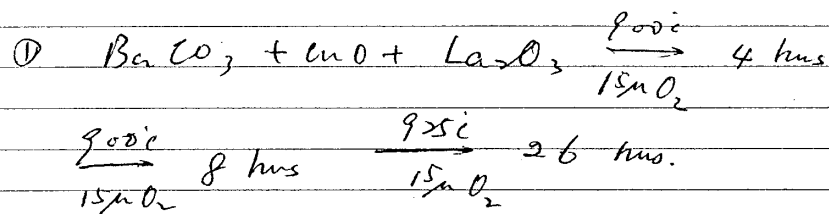
$$2 \times 10^{-4} \mu$$

(II) $\text{Ba}_{0.75} \text{La}_{4.25} \text{Cu}_5 \text{O}_5 (z-y)$

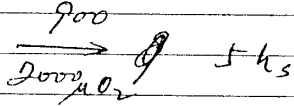
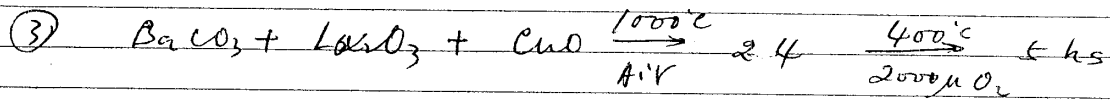
Ba $\text{La}_5 \text{Cu}_5 \text{O}_5$



(III) $(\text{LaBa})_2 \text{CuO}_4$



$$5 \times 10^{-3} = 5 \times 10^{-3} \times 760 = 3800 \times 10^{-3} \times 10^3 \mu = 3800 \mu$$



#3-4

3 x 10⁻⁴

Time	mV	O ₂ ppm	Time	mV	O ₂
7:30	37.3	15	2:00	0	30
8:30	37.3	16	2:30	11.5	40
8:50	37.3	16	3:03	14.0	30
9:10	37.3	16.5	3:10	16.1	30
10:10	37.3	16.5	3:17	18.5	30
#1-2			3:26	20.7	30
19 Nov. 8/6			3:30	22.8	30
4:00 p.m.	0	15	3:39	24.6	30
4:19	8.5	35	3:45	26.7	30
4:23	10.1	10.25	3:52	28.9	30
4:26	11.5	40	4:04	30.9	30
4:40	11.5	15	4:13	33.1	30
5:00	16.2	10	4:20	34.9	30
5:05	19.3	18	4:51	37.4	30
5:14	23.8	20	5:14	37.4	30
5:26	24.9	15	5:14	37.4	50
5:41	29.0	16	5:40	37.4	50
6:00	34.0	15	6:12	37.4	20
6:00	37.3	15	6:23	37.4	15
6:09 925	38.2	15	6:40	37.4	15
7:51	38.4	15	8:16	37.4	16
8:05	38.4	16.5	8:25	37.3	15
9:48	38.4	15	9:29	37.3	15
10:13	38.4	15	11:00	37.3	15
10:40	38.4	15	1:50 a.m., 22 Nov	37.3	15
6:30 a.m. 20 Nov. 8/6			2:30	37.3	15
6:30	38.4	13	9:01	37.3	15
6:35	38.6	15	10:47	37.3	15
9:00	38.6	15.5	12:13	37.3	15
11:00	38.6	16.5	2:17	37.3	15
12:07	38.2	15.5	3:20		
12:33	38.2	15	5:10	37.3	15
1:21	38.2	15.5	5:57	37.3	15
2:27	38.2	15.5	6:51	37.3	15
4:17	38.2	16			
5:23	38.2	15			
5:50	38.2	12			
6:47	38.2	14.5			
7:00	38.2	15.5			
8:00	38.2	15.5			

H 484

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1 B T_c 75 - 50° K 91

END II

H 486

K	ionic Radius	1.33 (+1)
Cu		0.96
Zn		0.69
La		1.15
Ba		1.35

Ba	1.35
Pb	1.20/0.84
Bi	1.20/0.74

Kel
 KClO₃
 Al₂O₃ comible.

2 Dec 1988

Ba₂Cu₅O₅ 1264 mg

Kel 15712 mg

30°C/h → 900 30h

Soak — ~~10~~h 12h

cooling 2°/h 900-600°C 150h

① 20 → 900 30h

② 900 — 900 12h

③ 900 — 750 75h

④ 750 — 600 75h

⑤ 600 — 54 — 5h

H 488

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	La	Ba	Ca	O
J-1 $(La_{0.4}Ba_{0.6})_2 CuO_4$	27.54	40.85	15.75	15.84
J-2 $(La_{0.5}Ba_{0.5})_2 CuO_4$	41.25	27.19	15.72	15.84
J-3 $(La_{0.7}Ba_{0.3})_2 CuO_4$	48.09	20.38	15.71	15.83
J-4 $(La_{0.8}Ba_{0.2})_2 CuO_4$	54.92	13.57	15.70	15.81
J-5 $(La_{0.85}Ba_{0.15})_2 CuO_4$	58.32	10.18	15.69	15.81
J-6 $(La_{0.9}Ba_{0.1})_2 CuO_4$	61.73	6.78	15.69	15.80
J-7 $La_2 CuO_4$	68.54	15.84	15.68	15.79

La_2O_3 : La 85.27

$BaCO_3$: Ba 69.59

CuO : Cu 79.88

J-4 $(La_{0.8}Ba_{0.2})_2 CuO_4$

J-5 $(La_{0.85}Ba_{0.15})_2 CuO_4$

J-6 $(La_{0.9}Ba_{0.1})_2 CuO_4$

Single crystal

- ① ~~SJ-8~~ (mid)
- ① SJ-8 (J-8-1 material)
- ② SJ-6a start from CuO, BaCO₃ and La₂O₃
- ③ SJ-6b start from (J-6 material) 400 ^{2000 μ} 5h
- ④ SJ-5 start from BaLaCu₃O₇ after two time heat at 900°C.

SJ-8

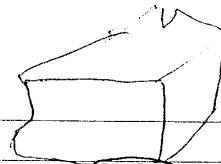
J-8-1 material ~~#~~ 1244.8 mg
KCl : BaCu = 8 : 1

[big one] old

~~SJ-6a~~ mid size big 2

✓ SJ-6b mid

SJ-5 small,



	8h	8h		
J-7-2	400 + 900c	(pell. 7 Kbar)		
	8h			
J-8-2	400 + 900c	(pell. n -)		
J-7-3	900c	(pell 7 Kbar)		
J-8-3	900c	(pell 7 bar)		

J-14 (J-6) . single phase .