

Calculation

H 1

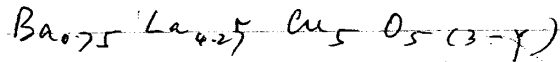


H 2

68-51-24

H 3

14 NOV 1986



Cu 63.54
Ba 137.34
La 138.91

La ₂ O ₃		
wt%	La	O
	85.27	

BaCO ₃		
wt%	Ba	O
	62.59	24.32

CuO		
wt%	Cu	O
	79.88	20.12



	Ba	La	Cu	O
wt%	9.46	54.01	29.18	7.35
	9.61	55.12	29.61	

$$\textcircled{1} \text{La}_2\text{O}_3 \quad 4885.40 \text{ mg} \times 85.27$$

$$\text{La} = 4163.22 \text{ mg}$$

$$\textcircled{2} \quad 4163.22 : 54.01 = x : 29.18$$

$$x_1 = 2249.264 \text{ Cu}$$

$$2249.26 : 79.88 = x_2 : 100$$

$$x_2 \text{ CuO} = 2815.80 \text{ mg}$$

$$\textcircled{3} \quad 4163.22 : 54.01 = x : 9.46$$

$$x_1 = 729.20 \text{ Ba}$$

$$729.20 : 69.59 = x_2 : 100$$

$$x_2 = 1047.85$$

$$\text{BaCO}_3 = 1047.85$$

12 Nov. 86

① after first time heatmelt. powder not as hard as

$\text{Ba}_2\text{La}_4\text{Cu}_5\text{O}_5$.

② after 24 h - 920°C heatmelt without react with
the boat. in good shape!

$$D = 5.0279 \text{ g/cm}^3$$

$$\pi r^2 = 3.14 \times 0.185'' \times 0.149'' = 0.06634 \text{ cm}^3$$

4

H

H

5

Ba, La, Cu 505 (short)

$$137.34 + 138.91 \times 4 + 63.54 \times 5 + 16 \times 5 \\ = 137.34 + 555.64 + 317.7 + 80 = 1090.68$$

	Ba	La	Cu	O
wt%	12.5%	50.9%	29.13	7.33

① La₂O₃ 5000 La = 4263.5

② Ba :
 $4263.5 : 50.95 = x : 12.5\%$
 $x = 1053.53$ Ba

BaCO₃ 1053.53 x : 69.5% = x : 100

BaCO₃ = 1513.91

③ CuO :
 $4263.5 : 50.95 = x : 29.13$
 $x = 2437.60$ Cu

CuO 2437.60 : 79.88 = x : 100

$x = 3051.58$

19 NOV - 86

① after heat treatment powder solid together extremely hard

② after 720°C 24 heat treatment sample stick with
quartz tube a little green color □ gauge or m?

S H

H C

Stein

а н н 7

J-413 51 61

7 Dec 1986

Ba-La-cuO_x
J-4 / J-5 / J-6

J-4 / J-5 / J-6

200°C kept 12 hours
950°C

Time	T _{min}	T _c	O _{pressure}
5:12	0	0	15
7:45	21.4		15
8:30	26.9		15
9:30	33.5		20
X 10:00 am	38.4		15
10:45	38.2		15

- ① heat 900°C 8 hours
- ② " " "
- ③ 925°C 24 h
- in air

8 Dec.

8:30	38.2		20
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Sample color brown

1:44	0	0	15
2:41	17.4		15
3:33	25.0		15
3:50	38.2		16
3:54	38.5		15
4:35	38.3		15

8

11

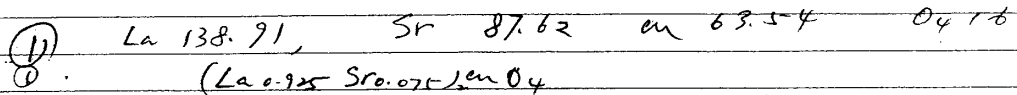
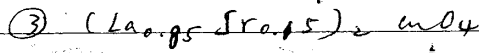
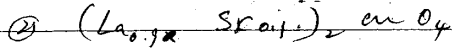
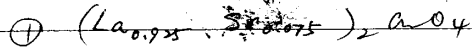
11

9

$\text{SrCO}_3 \neq 109.62$

Sr: 58.56

23 Dec 1988



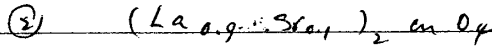
	La	Sr	Cu	O ₂
wt%	64.62	3.31	15.98	16.09

$(\text{La}_{0.6000}) \times 85.27 = 5116.2$

Sr: $307.33 \times 58.56 = 179.97$

Cu: $1483.75 \times 79.88 = 1185.22$

SrCO_3 447.50
CuO = 1583.86



	La	Sr	Cu	O
wt%	63.28	4.44	16.08	16.20

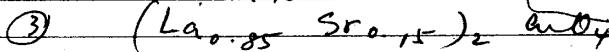
$(\text{La}_{0.6000}) = 5116.2 \text{ mg}$

Sr: 420.98

Cu: 1524.65

SrCO_3 : 612.88

CuO: 1627.53



	La	Sr	Cu	O
wt%	60.55	6.75	16.27	16.41

$(\text{La}_{0.6000})$

Sr: 668.87

Cu: 1614.2

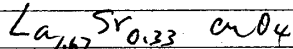
La: 5116.2

SrCO_3 973.95

CuO 1723.123

big pt mol

④



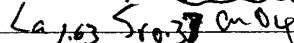
$\text{La}_2\text{O}_3 = 6000$ (La: 5116.2)

$\text{SrCO}_3 = 1088.428$ (Sr: 637.88)

CuO: 1754.579 (Cu: 1401.558)

big pt mol

⑤



$\text{La}_2\text{O}_3 = 6000$ (La: 5116.2)

Et

$\text{SrCO}_3 = 120.923$ (Sr: 70.0)

CuO: 1799.3577

Cu: 1401.558

H 12

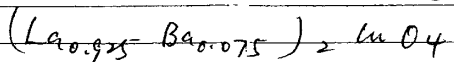
① 950 one day (air vacuum)

② 1200 °C

③ 10°C/h

23 Dec 1986

J15

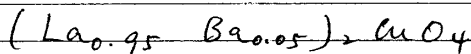


La	Ba	Cu	O
63.44	5.1	15.88	15.78

(wg)

La_2O_3 : 2000 mg 1200
 $BaCO_3$: 197.01 mg $197.01 \times 6 = 1182.06$
 CuO : 527.68 mg $527.68 \times 6 = 3166.08$

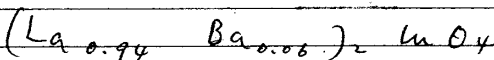
J16



wt%	La	Ba	Cu	O
	65.13	3.4	15.68	15.79

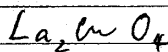
La_2O_3 : 2000 mg
 $BaCO_3$: 127.92 mg
 CuO : 513.98 mg

J17



wt%	La	Ba	Cu	O

J-20



wt%	La	Cu	O
	68.54	15.67	15.79

La_2O_3 : 3000 mg (La 2558.10)
 CuO : 733.12 mg

1987 Jan. 1.

- ① (La_{0.925} Sr_{0.075})₂ m O₄ — 8.1
- ↓ ② (La_{0.9} Sr_{0.1})₂ m O₄ — 16.9 SL-2
- ③ (La_{0.85} Sr_{0.15})₂ m O₄ — 0
- ④ (La_{0.825} Sr_{0.175})₂ m O₄ — 4.6
- ⑤ (La_{0.815} Sr_{0.185})₂ m O₄ — 5

- | | | | |
|---|--|---|------|
| ① | La ₂ m O ₄ | — | 0 |
| ② | (La _{0.95} Ba _{0.05}) ₂ m O ₄ | — | 1.6 |
| ③ | (La _{0.925} Ba _{0.075}) ₂ m O ₄ | — | 17.4 |
| ④ | (La _{0.9} Ba _{0.1}) ₂ m O ₄ | — | 17.4 |
| ⑤ | | | |

- ① La₂ m O₄ — 0
- ② (La_{0.95} Ba_{0.05})₂ m O₄ — 1.6
- J-22 ③ (La_{0.925} Ba_{0.075})₂ m O₄ — 17.4
- ↓ J-18 ④ (La_{0.9} Ba_{0.1})₂ m O₄ — 17.4

J-18
 SL-2 Gaballa (Jan 1)
 Hall (X)

Single : La₂O₃ + mO → 950°C one day

O₂ at 1200°C H 15
 10°C/h

Ba_{0.5}La_{0.5}Cu₁

3 Jan 1986

① (Ba_{0.5}La_{0.5})₅ Cu₅O₅ (3-y)

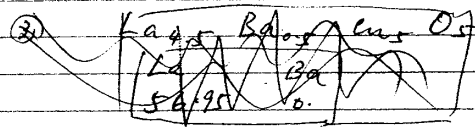
La₂O₃: 85.27
Ba: 69.59
Cu: 79.88

wt%	Ba	La	Cu	O
	31.55	31.91	29.19	7.35
	La ₂ O ₃ : 3000		La: 2558.10	
	BaCO ₃ : 3634.49			
	CuO: 2929.46			

⇒ 6000
7268.98
~~5858.92~~
5858.92

② (Ba_{0.4}La_{0.6})₅ Cu₅O₅

wt%	Ba	La	Cu	O
	25.22	38.26	29.17	7.35
		La: 2558.10		
		BaCO ₃ : 1686.23 2423.09		
		CuO: 2441.16		



③ Ba_{0.5}La_{0.5}Cu₁O₅

wt%	Ba	La	Cu	O
	6.4	56.95	29.28	7.37

④ (Ba_{0.3}La_{0.7})₅ Cu₅O₅

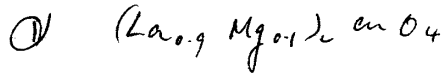
Ba_{1.5}La_{3.5}Cu₅O₅

137.34 x 1.5 + 138.91 x 3.5 + 317.7 + 80
206.01 + 486.19 + 317.7 + 80 = 1089.9
18.91 + 44.61 = 29.15 = 7.3

	Ba	La	Cu	O
	18.91	44.61	29.15	7.3

La₂O₃: 3000 La: 2558.10
BaCO₃: 1558.23
CuO: 2092.60

12. Jan 1987



$$138.91 \times 1.8 + Mg \quad 24.31 \times 0.2 + 63.54 + 16 \times 4$$

$$250.0 + 4.86 + 63.54 + 64 = 382.4$$

La	Mg	en	O
65.38	1.27	16.61	16.74
		16.61	

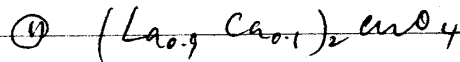
$$La_2O_3 : 12000 \times 85.27 = 10232.40 \text{ mg}$$

$$MgCO_3 = 24.312 + 12 + 16 \times 3 = 84.31$$

Mg 28.84

$$MgCO_3 \quad 689.18 \text{ mg}$$

$$enO \quad 3253.94 \text{ mg}$$



$$138.91 \times 1.8 + 40.08 \times 0.2 + 63.54 + 16 \times 4 =$$

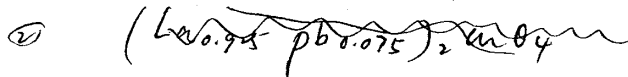
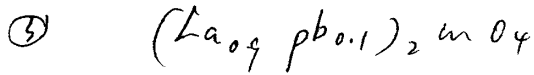
$$250.04 + 8.02 + 63.54 + 64 = 385.6$$

La	Ca	en	O
64.84	2.08	16.48	16.6

$$La_2O_3 : \del{6000}, 6000, \quad Ca \quad 5116.20$$

$$CaCO_3 \quad 164.12 / 40.08 = 409.48$$

$$enO \quad 1627.88$$



① $La \quad 138.91 \times \frac{1.8}{9} + 207.19 \times 0.2 + 63.54 + 64$
 $= 250.039 + 41.44 + 63.54 + 64$
 $= 419.02$

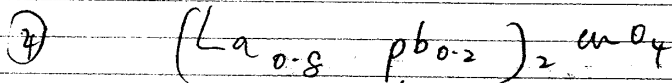
La	Pb	Cu	O
58.67	9.9	15.16	15.27

$(La_2O_3 : 2000 \text{ mg}) \times 85.27 = 1705.40 \text{ mg}$

$PbO_2 \quad 207.19 + 32 = 239.19 \quad Pb : 86.62$

$PbO_2 : 326.66 \text{ mg}$

$CuO : 542.41 \text{ mg}$



$222.256 + 82.876 + 63.54 + 64$
 $= 432.672$

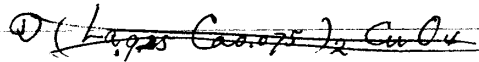
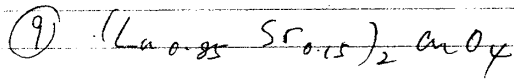
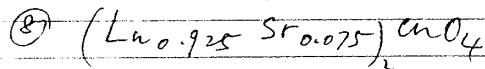
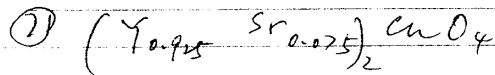
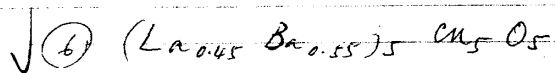
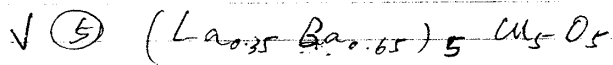
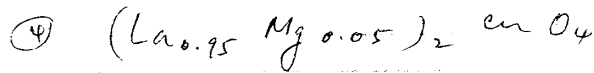
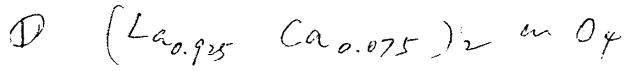
La	Pb	Cu	O
51.37	19.15	14.69	14.79

$La_2O_3 : 2000 \text{ mg} \times 85.27 = 1705.40 \text{ mg}$

$PbO_2 : 733.94 \text{ mg}$

$CuO : 610.488 \text{ mg}$

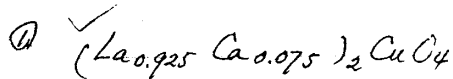
14 Jan 1987



La_2O_3 ; La : $\overset{68}{85.277\%}$

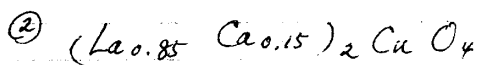
$MgCO_3$; Mg : 28.836%

$CaCO_3$; Ca : 40.048%



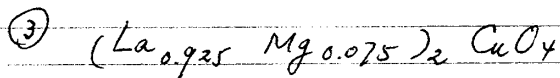
La	Ca	Cu	O
65.803%	1.539%	16.270%	16.388%

$La_2O_3 : 1000 \text{ mg}$
 $CaCO_3 : 49.800 \text{ mg}$
 $CuO : 263.947 \text{ mg}$



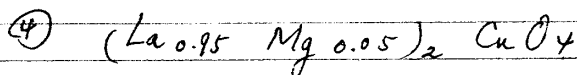
La	Ca	Cu	O
62.853%	3.20%	16.912%	17.024%

$La_2O_3 : 1000 \text{ mg} = 2000$
 $CaCO_3 : 108.400 \text{ mg} = 216.8$
 $CuO : ~~572.934~~ 287.222 \text{ mg} = 574.44$



La	Mg	Cu	O
66.204%	0.939%	16.369%	16.488%

$La_2O_3 : 1000 \text{ mg} \times 2 = 2000 \text{ mg}$
 $MgCO_3 : 41.940 \text{ mg} \times 2 = 83.88 \text{ mg}$
 $CuO : 263.947 \text{ mg} \times 2 = 527.856$



La	Mg	Cu	O
67.004%	0.617%	16.131%	16.248%

$La_2O_3 : 1000 \text{ mg} \times 2 = 2000 \text{ mg}$
 $MgCO_3 : 117.231 \text{ mg} \times 2 = 54.462 \text{ mg}$
 $CuO : 257.004 \text{ mg} \times 2 = 514.008 \text{ mg}$



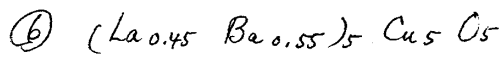
La	Ba	Cu	O
22.361%	41.057%	29.223%	7.359%

OK

$$La_2O_3 : 1000 \text{ mg} \times 2 = 2000 \text{ mg}$$

$$BaCO_3 : 2249.570 \text{ mg} \times 2 = 4498.864 \text{ mg}$$

$$CuO : 1395.022 \text{ mg} \times 2 = 2790.044 \text{ mg}$$

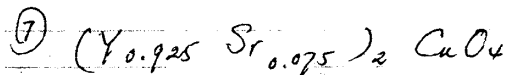


La	Ba	Cu	O
28.729%	34.716%	29.202%	7.353%

$$La_2O_3 : 1000 \text{ mg} \times 2 = 2000 \text{ mg}$$

$$BaCO_3 : 1480.428 \text{ mg} \times 2 = 2960.856 \text{ mg}$$

$$CuO : 1085.022 \text{ mg} \times 2 = 2170.044 \text{ mg}$$

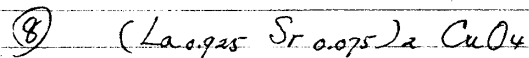


Y	Sr	Cu	O
53.898%	4.307%	20.822%	20.973%

$$Y_2O_3 : 1000 \text{ mg}$$

$$SrCO_3 : 105.999 \text{ mg}$$

$$CuO : 380.809 \text{ mg}$$

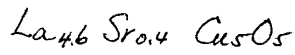


La	Sr	Cu	O
64.623%	3.305%	15.978%	16.094%

$$La_2O_3 : 1000 \text{ mg}$$

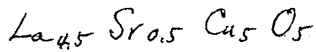
$$SrCO_3 : 73.464 \text{ mg}$$

$$0.5 CuO : 267.927 \text{ mg}$$



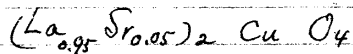
La	Sr	Cu	O
59.622	3.270	29.644	7.465

La_2O_3 : 1000 mg
 ~~SrCO_3 : 67.142 mg~~ 78.783 mg
 CuO : 530.736 mg



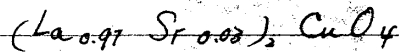
La	Sr	Cu	O
58.606	4.107	29.786	7.500

La_2O_3 : 1000 mg
 ~~SrCO_3 : 85.854 mg~~ 100.664 mg
 CuO : 542.523 mg



La	Sr	Cu	O
65.944	2.189	15.876	15.991

La_2O_3 : 1000 mg
 ~~SrCO_3 : 40.667 mg~~ 47.683 mg
 CuO : 256.989 mg



La	Sr	Cu	O
66.989	1.307	15.995	15.909

La_2O_3 : 1000 mg
 ~~SrCO_3 : 23.903 mg~~ 28.026 mg
 CuO : 251.689 mg

69

H

H

22

(La_{0.9} Sr_{0.1})₂ CuO₄

	La	Sr	Cu
wt%	63.28	4.44	16.08
wt% mag	1000	100.69	271.24

~~52602~~

SLE-1

La_{1.6} Sr_{0.2} Eu_{0.2} CuO₄

La	Sr	Eu	Cu
75.52	5.29		
69.17	4.85	8.40	17.58

La₂O₃ : 100

SrCO₃ : ~~10.07~~

Eu₂O₃

CuO

SLE-1

La_{1.6} Sr_{0.2} Eu_{0.2} CuO₄

La	Sr	Eu	Cu
66.60	5.25	9.11	19.04

La₂O₃ : 100

SrCO₃ : ~~13.15~~ 13.28

Eu₂O₃ : 15.84

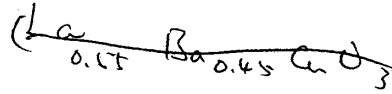
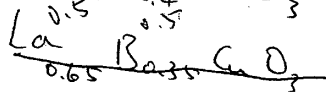
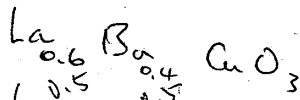
CuO : 35.79

SS

H

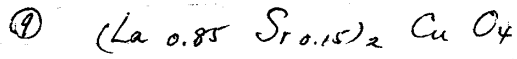
H

23



Sintered **H** **24**

under Vacuum



La	Sr	Cu	O
60.555%	6.740%	16.293%	16.411%

$La_2O_3 : 1000 \text{ mg}$

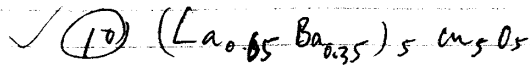
$SrCO_3 : 159.883 \text{ mg}$

$CuO : 287.210 \text{ mg}$

$La_2O_3 : 85.268$

$BaCO_3 : 67.60$

$CuO : 77.88$



La	Ba	Cu	O
41.737%	22.060%	29.160%	7.343%

$La_2O_3 : 1000 \text{ mg} \quad 2000 \text{ mg}$

$BaCO_3 : 652.220 \text{ mg} \quad 1304.440 \text{ mg}$

$CuO : 751.186 \text{ mg} \quad 1502.372 \text{ mg}$

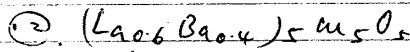


La	Ba	Cu	O
47.778%	15.746%	29.139%	7.338%

$La_2O_3 : 1000 \text{ mg} \quad 2000 \text{ mg}$

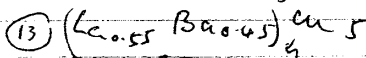
$BaCO_3 : 403.756 \text{ mg} \quad 807.512 \text{ mg}$

$CuO : 651.021 \text{ mg} \quad 1302.041 \text{ mg}$



La	Ba	Cu	O
38.23 38.26	25.22 25.22	29.17 29.17	7.35 7.35

$La_2O_3 : 1000 \text{ mg} \quad BaCO_3 : 807.58 \quad CuO : 813.86$



La	Ba	Cu	O
35.087 35.087	24.181 24.181	29.181 29.181	7.348 7.348

$La_2O_3 : 1000 \text{ mg}$
 $BaCO_3 : 991.035 \text{ mg}$
 $CuO : 887.773 \text{ mg}$

H 25

La_{4.6} Ba_{0.4} Cu₅ O₅

La	Ba	Cu	O
58.535%	5.033%	29.103%	7.329%

La₂O₃ : 1000 mg

BaCO₃ : 105.339 mg

CuO : 530.726 mg

La_{4.5} Ba_{0.5} Cu₅ O₅

La	Ba	Cu	O
57.271%	6.292%	29.108%	7.329%

La₂O₃ : 1000 mg

BaCO₃ : 134.596 mg

CuO : 542.532 mg

(La_{0.95} Ba_{0.05})₂ Cu O₄

La	Ba	Cu	O
65.135%	3.389%	15.681%	15.795%

La₂O₃ : 1000 mg

BaCO₃ : 63.743 mg

CuO : 286.985 mg

(La_{0.97} Ba_{0.03})₂ Cu O₄

La	Ba	Cu	O
66.496%	2.033%	15.679%	15.792%

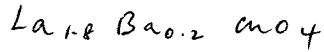
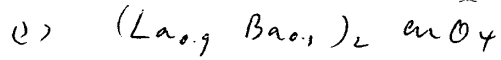
La₂O₃ : 1000 mg

BaCO₃ : 27.556 mg

CuO : 257.693 mg

H U 26

1987. Jan 26.



$$138.91 \times 1.8 + 137.34 \times 0.2 + 63.54 \times 4 + 16 \times 4$$

$$= 250.038 + 27.468 + 63.54 + 64 = 405.046$$

	La	Ba	cu	O
wt%	61.73	6.781	15.687	15.80
	61.73	6.78	15.69	15.80

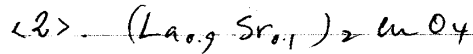
La₂O₃: 85.268

BaCO₃: 69.60

mO: 79.88

B₂CO₃: 59.36

	La	Ba	cu	O
wt%	61.73	6.78	15.69	15.80
mg	1000	134.56	271.32	



$$138.91 \times 1.8 + 137.34 \times 87.62 \times 0.2 + 13.54 + 64$$

$$= 250.038 + 17.524 + 63.54 + 64 = 395.102$$

	La	Sr	cu	O
wt%	63.28	4.44	16.08	16.20
mg	1000	59.36	271.24	16.20

	La	Sr	cu	O
wt%	63.28	4.44	16.08	16.20
mg	1000	100.69	271.24	

75.5 5.29 87.8

19.19

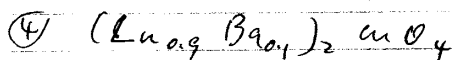
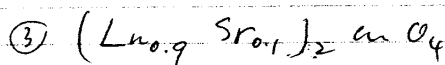
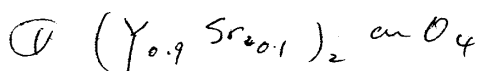
H 27

13 Jan 1987

$$Y_2O_3 \quad 88.905 \times 2 + 16 \times 3 = 177.81 + 48 = \overset{225.81}{\cancel{225.81}}$$

$$Lu_2O_3 \quad 174.87 \times 2 + 16 \times 3 = 349.74 + 48 = 397.74$$

Y_2O_3	$Y = \underline{78.74}$	$SrCO_3$	$\underline{Sr: 59.36 \%}$
Lu_2O_3	$Lu = \underline{87.94}$	$BaCO_3$	$\underline{Ba: 69.60 \%}$
		CuO	$\underline{Cu: 79.88 \%}$



YS-1 :

Y	Sr	Cu	O
52.45	5.74	20.83	20.98

$$Y_2O_3 : \boxed{1000} \times 78.74 = 787.4 \text{ mg}$$

$$SrCO_3 : 145.167 \text{ mg}$$

$$CuO : 391.472 \text{ mg}$$

YB-1 $Y_{1.2} Ba_{0.2} CuO_4$

Y	Ba	Cu	O
50.80	8.72	20.17	20.32

$$8 Y_2O_3 : H (1000 \text{ mg})$$

$$BaCO_3 : 194.195 \text{ mg}$$

$$CuO : 391.381 \text{ mg}$$

H 47

LuS-1

Lu	Sr	Cu	O
68.47	3.81	13.81	13.91

$$\text{Lu}_2\text{O}_3 : 1000 \text{ mg} / 2 = 500 \text{ mg}$$

$$\text{SrCO}_3 : 82.436 \text{ mg} / 2 = 41.218 \text{ mg}$$

$$\text{CuO} : 222.045 \text{ mg} / 2 = 111.0225 \text{ mg}$$

LuB-1

Lu	Ba	Cu	O
67.02	5.84	13.52	13.62

$$\text{Lu}_2\text{O}_3 : 1000 \text{ mg} = 500 \text{ mg}$$

$$\text{BaCO}_3 : 110.800 \text{ mg} = 55.05 \text{ mg}$$

$$\text{CuO} : 222.086 \text{ mg} = 111.043 \text{ mg}$$