

## **LAMPIRAN**

## LAMPIRAN A

Perhitungan massa bahan dasar sampel BPSCCO-2223 dengan kadar Ca = 2,10

Tabel 2. Berat Molekul (BM) senyawa penyusun BPSCCO-2223 dengan kadar Ca = 2,10.

Bahan	BeratMolekul (BM) (gram/mol)	Fraksi	Jumlah Atom
Bi <sub>2</sub> O <sub>3</sub>	465, 9589	1,60	2
PbO	223,1894	0,40	1
SrCO <sub>3</sub>	147, 6292	2,00	1
CaCO <sub>3</sub>	100,0872	2,10	1
CuO	79,5454	3,00	1

- Perhitungan BM-X total

$$\begin{aligned}
 \text{BM-X (Bi}_2\text{O}_3) &= \text{BM} \times \left( \frac{1}{\text{jumlah atom}} \right) \times \text{fraksi} \\
 &= 465, 9589 \times \left( \frac{1}{2} \right) \times 1,60 \\
 &= 372, 7671 \text{ gram/mol}
 \end{aligned}$$

$$\begin{aligned}
 \text{BM-X (PbO)} &= 223,1894 \times \left( \frac{1}{1} \right) \times 0,40 \\
 &= 89, 2758 \text{ gram/mol}
 \end{aligned}$$

$$\begin{aligned}
 \text{BM-X (SrCO}_3) &= 147, 6292 \times \left( \frac{1}{1} \right) \times 2,00 \\
 &= 295, 2584 \text{ gram/mol}
 \end{aligned}$$

$$\begin{aligned}
 \text{BM-X (CaCO}_3) &= 100,0872 \times \left( \frac{1}{1} \right) \times 2,10 \\
 &= 210, 1831 \text{ gram/mol}
 \end{aligned}$$

$$\begin{aligned}
 \text{BM-X (CuO)} &= 79,5454 \times \left( \frac{1}{1} \right) \times 3,00 \\
 &= 238, 6362 \text{ gram/mol}
 \end{aligned}$$

$$\begin{aligned}
 \text{BM-X Total} &= \text{BM-X (Bi}_2\text{O}_3) + \text{BM-X (PbO)} + \text{BM-X (SrCO}_3) + \\
 &\quad \text{BM-X (CaCO}_3) + \text{BM-X (CuO)} \\
 &= 372, 7671 + 89, 2758 + 295, 2584 + 210, 1831 + 238, 6362 \\
 &= 1206, 1206 \text{ gram/mol}
 \end{aligned}$$

- Perhitungan untuk membuat 3 gram sampel

$$\begin{aligned}
 \text{BB (Bi}_2\text{O}_3) &= \frac{BM-X}{BM-X \text{ Total}} \times \sum \text{berat sampel} \\
 &= \frac{372,7671}{1206,1206} \times \sum 3 \text{ gram} \\
 &= 0,9272 \text{ gram}
 \end{aligned}$$

$$\begin{aligned}
 \text{BB (PbO)} &= \frac{89,2758}{1206,1206} \times \sum 3 \text{ gram} \\
 &= 0,2220 \text{ gram}
 \end{aligned}$$

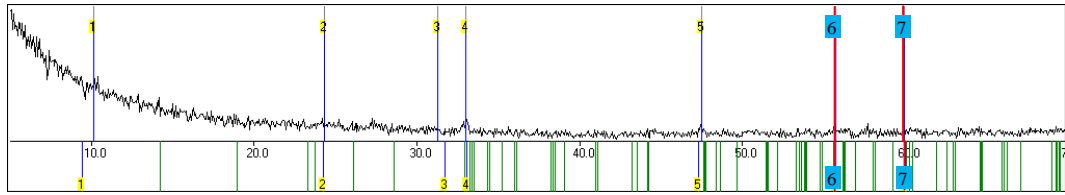
$$\begin{aligned}
 \text{BB (SrCO}_3) &= \frac{295,2584}{1206,1206} \times \sum 3 \text{ gram} \\
 &= 0,7344 \text{ gram}
 \end{aligned}$$

$$\begin{aligned}
 \text{BB (CaCO}_3) &= \frac{210,1831}{1206,1206} \times \sum 3 \text{ gram} \\
 &= 0,5228 \text{ gram}
 \end{aligned}$$

$$\begin{aligned}
 \text{BB (CuO)} &= \frac{238,6362}{1206,1206} \times \sum 3 \text{ gram} \\
 &= 0,5936 \text{ gram}
 \end{aligned}$$

## LAMPIRAN B

BPSCCO-2223/Ts 840



	2delta(T)	Lambda	a	b	c	alpha	beta	gamma
Initial	0	154.180	54.235	54.429	374.415	90.000	90.000	90.000
Final	100.000	100.000	30.000	243.095	243.095	24.239	0.07	1.000
Sigmatas	200.000	154.180	0	330.125	330.125	33.032	-0.019	2.000

No	H	K	L	2T(Obs)	2T-Zero	2Th(Cal)	Dif	DoCor.	DCalc	Intensitas
1	0	0	4	10.127	10.127	9.448	0.679	87.346	93.604	119
2	1	1	3	24.309	24.309	24.239	0.07	36.613	36.718	41
3	1	1	9	31.272	31.272	31.702	-0.43	28.602	28.224	32
4	2	0	0	33.012	33.012	33.032	-0.019	27.133	27.118	33
5	2	2	0	47.453	47.453	47.321	0.132	19.159	19.209	31*
6	2	0	18	55.705	55.705	55.690	0.014	16.501	16.505	43*
7	0	2	20	59.960	59.960	59.975	-0.015	15.427	15.424	34

Intensitas			Fraksi Volume (%)	Impuritas (%)	Derajat Orientasi (%)
I-Total	I-2223	I-001			
333	256	119	76,88	23,12	46,48

Keterangan:

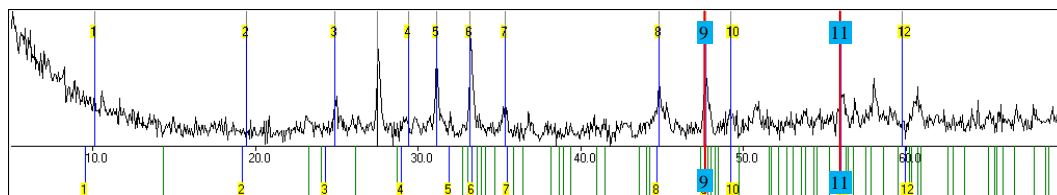
\* = Impuritas ber-hkl

I-Total = Intensitas total

I-2223 = Intensitas fase 2223

I-001 = Intensitas fase 2223 dengan bilangan *l*  
genap

BPSCCO-2223/Ts 845



	2delta(T)	Lambda	a	b	c	alpha	beta	gamma
Initial	0	154.180	53.835	54.771	370.278	90.000	90.000	90.000
Final	0	0	80.000	194.612	194.612	19.175	0.286	1.000
Sigmas	0	154.180	120.000	293.917	293.917	28.935	0.456	1.000

No	H	K	L	2T(Obs)	2T-Zero	2Th(Cal)	Dif	DoCor.	DCalc	Intensitas
1	0	0	4	10.111	10.111	9.554	0.557	87.481	92.570	119
2	0	0	8	19.461	19.461	19.175	0.286	45.611	46.285	75
3	1	1	3	24.878	24.878	24.277	0.6	35.789	36.661	106
4	0	0	12	29.392	29.392	28.935	0.456	30.388	30.857	72
5	1	1	9	31.133	31.133	31.881	-0.748	28.727	28.070	172
6	2	0	0	33.196	33.196	33.285	-0.088	26.987	26.917	222
7	1	1	11	35.324	35.324	35.465	-0.14	25.408	25.311	106
8	2	0	12	44.803	44.803	44.674	0.129	20.228	20.284	131
9	2	2	2	47.641	47.641	47.623	0.017	19.088	19.094	155*
10	0	0	20	49.188	49.188	49.214	-0.026	18.523	18.514	96
11	1	3	7	55.959	55.959	55.950	0.009	16.432	16.434	113*
12	0	0	24	59.764	59.764	59.956	-0.192	15.473	15.428	76

Intensitas			Fraksi Volume (%)	Impuritas (%)	Derajat Orientasi (%)
I-Total	I-2223	I-001			
1.443	1.175	438	81,43	18,57	37,28

Keterangan:

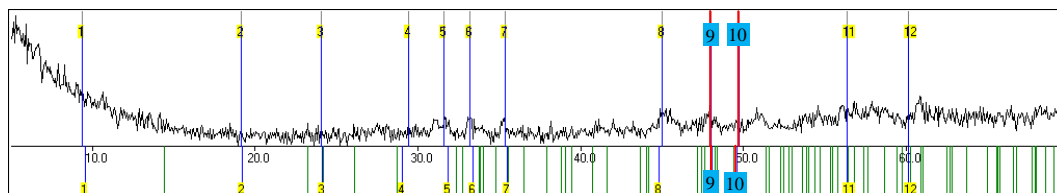
\* = Impuritas ber-hkl

I-Total = Intensitas total

I-2223 = Intensitas fase 2223

I-001 = Intensitas fase 2223 dengan bilangan l  
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## BPSCCO-2223/Ts 850



	2delta(T)	Lambda	a	b	c	alpha	beta	gamma
Initial	0	154.180	53.707	55.357	369.178	90.000	90.000	90.000
Final	0	0	80.000	191.521	191.521	19.233	-0.081	0
Sigmas	0	154.180	120.000	294.023	294.023	29.023	0.379	1.000

No	H	K	L	2T(Obs)	2T-Zero	2Th(Cal)	Dif	DoCor.	DCalc	Intensitas
1	0	0	4	9.353	9.353	9.583	-0.229	94.553	92.295	124
2	0	0	8	19.152	19.152	19.233	-0.081	46.340	46.147	51
3	0	0	10	24.052	24.052	24.106	-0.054	37.000	36.918	50
4	0	0	12	29.402	29.402	29.024	0.379	30.377	30.765	57
5	1	1	9	31.594	31.594	31.857	-0.263	28.318	28.090	70
6	2	0	0	33.206	33.206	33.366	-0.16	26.979	26.853	67
7	1	1	11	35.333	35.333	35.464	-0.13	25.402	25.312	56
8	2	0	12	45.003	45.003	44.798	0.205	20.143	20.231	73
9	1	1	17	47.969	47.969	48.089	-0.12	18.965	18.920	60*
10	2	2	6	49.709	49.709	49.562	0.148	18.341	18.392	65*
11	2	2	12	56.349	56.349	56.327	0.022	16.327	16.333	102
12	0	0	24	60.153	60.153	60.153	0	15.382	15.382	56

Intensitas			Fraksi Volume (%)	Impuritas (%)	Derajat Orientasi (%)
I-Total	I-2223	I-001			
831	706	338	84,96	15,04	47,87

Keterangan:

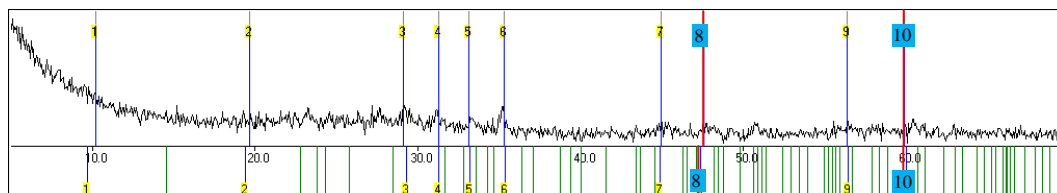
\* = Impuritas ber-hkl

I-Total = Intensitas total

I-2223 = Intensitas fase 2223

I-001 = Intensitas fase 2223 dengan bilangan 1  
genap

## BPSCCO-2223/Ts 855



	2delta(T)	Lambda	a	b	c	alpha	beta	gamma
Initial	0	154.180	53.885	55.199	367.889	90.000	90.000	90.000
Final	0	0	80.000	196.679	196.679	19.301	0.367	0
Sigmatas	100.000	154.180	90.000	312.719	312.719	31.905	-0.633	2.000

No	H	K	L	2T(Obs)	2T-Zero	2Th(Cal)	Dif	DoCor.	DCalc	Intensitas
1	0	0	4	10.191	10.191	9.616	0.575	86.795	91.972	112
2	0	0	8	19.668	19.668	19.301	0.367	45.137	45.986	67
3	0	0	12	29.080	29.080	29.127	-0.047	30.706	30.657	95
4	1	1	9	31.272	31.272	31.905	-0.633	28.602	28.049	70
5	2	0	0	33.141	33.141	33.253	-0.111	27.030	26.942	62
6	1	1	11	35.269	35.269	35.532	-0.263	25.447	25.265	88
7	2	0	12	44.939	44.939	44.781	0.158	20.171	20.238	68
8	2	2	2	47.517	47.517	47.413	0.105	19.134	19.174	57*
9	2	2	12	56.349	56.349	56.374	-0.025	16.327	16.320	56
10	1	3	11	59.895	59.895	59.886	0.009	15.442	15.445	37*

Intensitas			Fraksi Volume (%)	Impuritas (%)	Derajat Orientasi (%)
I-Total	I-2223	I-001			
712	618	274	86,80	13,20	44,34

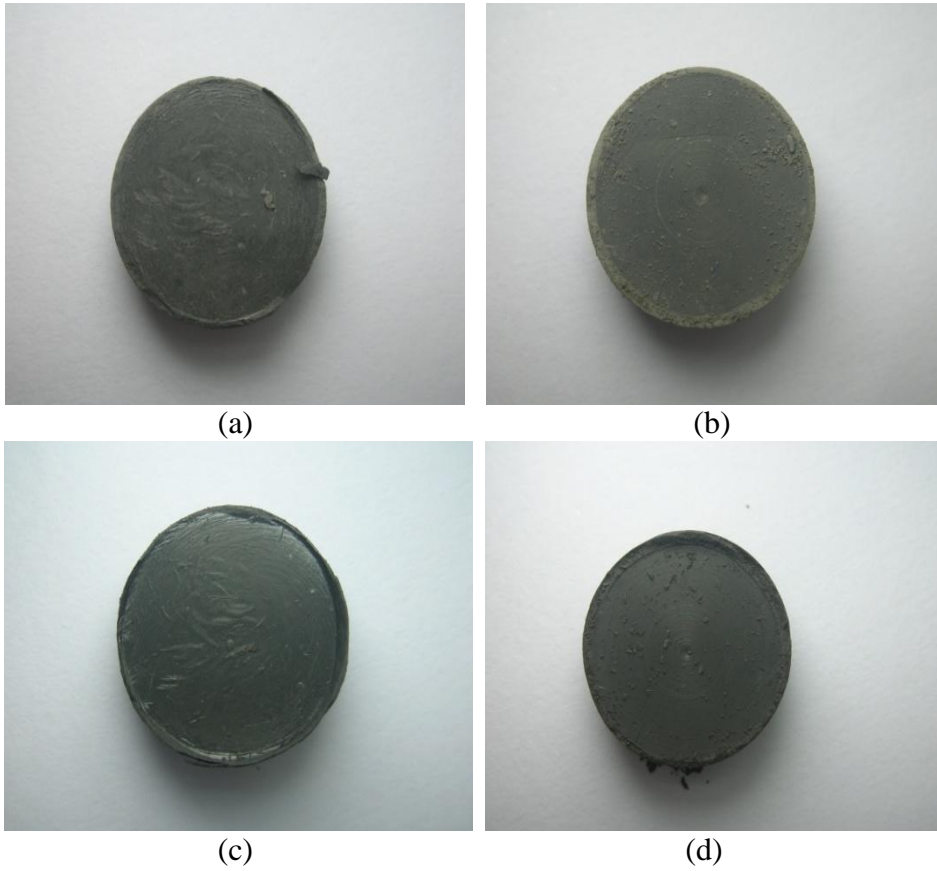
Keterangan:

\* = Impuritas ber-hkl

I-Total = Intensitas total

I-2223 = Intensitas fase 2223

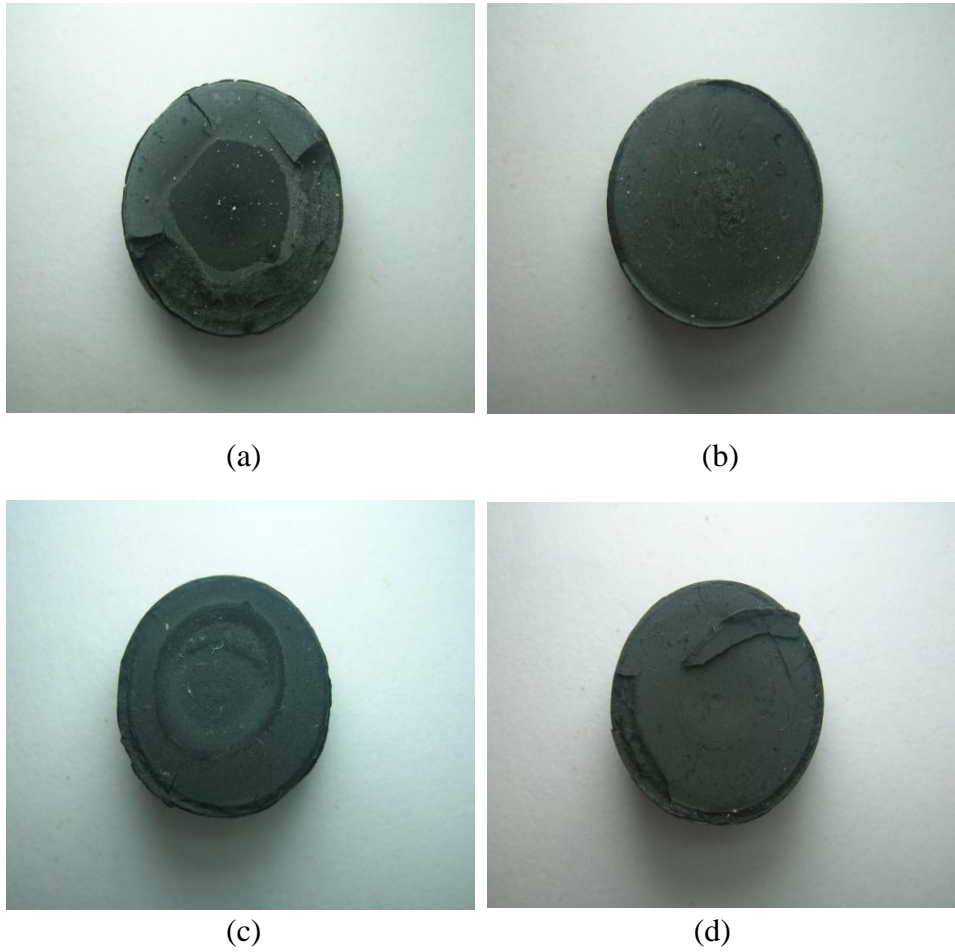
I-001 = Intensitas fase 2223 dengan bilangan l genap

**LAMPIRAN C****1. Foto sampel superkonduktor sebelum kalsinasi**

Gambar 17. Foto sampel sebelum kalsinasi (a) BPSCCO-2223/Ts 840 (b) BPSCCO-2223/Ts 845 (c) BPSCCO-2223/Ts 850 (d) BPSCCO-2223/Ts 855.

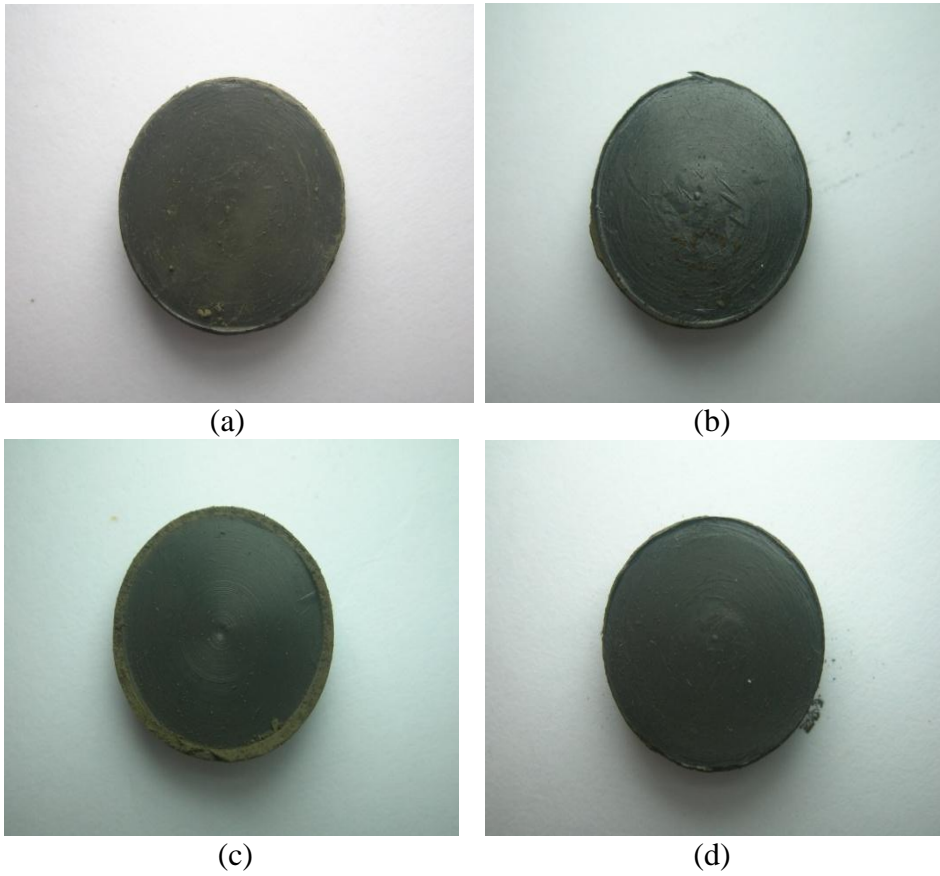


2. Foto sampel superkonduktor setelah kalsinasi



Gambar 18. Foto sampel setelah kalsinasi (a) BPSCCO-2223/Ts 840 (b) BPSCCO-2223/Ts 845 (c) BPSCCO-2223/Ts 850 (d) BPSCCO-2223/Ts 855.

3. Foto sampel superkonduktor sebelum sintering



Gambar 19. Foto sampel sebelum sintering (a) BPSCCO-2223/Ts 840 (b) BPSCCO-2223/Ts 845 (c) BPSCCO-2223/Ts 850 (d) BPSCCO-2223/Ts 855.

4. Foto sampel superkonduktor setelah sintering



(a)



(b)



(c)



(d)

Gambar 20. Foto sampel setelah sintering (a) BPSCCO-2223/Ts 840 (b) BPSCCO-2223/Ts 845 (c) BPSCCO-2223/Ts 850 (d) BPSCCO-2223/Ts 855.

5. Foto alat dan bahan yang digunakan dalam sintesis superkonduktor BPSCCO-2223



(a)



(b)



(c)



(d)



(e)



(f)



(g)



(h)

Gambar 21. Foto alat dan bahan yang digunakan dalam sintesis superkonduktor BPSCCO-2223. (a) bahan dasar sintesis superkonduktor BPSCCO (b) neraca *sartorius* digital (c) mortar dan *paste* (d) spatula (e) *die* (f) *pressing* (g) cawan (h) *furnace*.