**Lampiran I**

**Tabel data porositas dan densitas**

I.1 Densitas

$$\text{Densitas} = \frac{BK}{BB-(BBg-BKw)}\ \text{g/cm}^3$$

I.2 Porositas

$$\text{Porositas} = \frac{BB-BK}{BB-(BBg-BKw)} \times 100\,\%$$

Keterangan:

BB = masa basah (g)

BK = masa kering (g)

BBg = masa basah gantung (g)

BKw = masa kawat (g)

**Data porositas dan densitas**

| Sampel | BKw (g) | BB (g) | BBg (g) | BK (g) | Porositas | Densitas |
|---|---|---|---|---|---|---|
| 25 % $Al_2O$; 7 jam | 0,0441 | 2,0706 | 1,8289 | 2,0466 | 8,39 % | 7,16 $g.cm^{-3}$ |
| 25 % $Al_2O$; 9 jam | 0,0441 | 2,0078 | 1,7693 | 1,9577 | 17,73 % | 6,80 $g.cm^{-3}$ |
| 25 % $Al_2O$; 11 jam | 0,1152 | 1,0023 | 0,9283 | 0,9487 | 28,32 % | 5,01 $g.cm^{-3}$ |
| 33 % $Al_2O$; 9 jam | 0,0441 | 1,9810 | 1,7024 | 1,8885 | 28,67 % | 5,85 $g.cm^{-3}$ |
| 33 % $Al_2O$; 11 jam | 0,1152 | 1,1569 | 1,0707 | 1,1079 | 24,32 % | 5,43 $g.cm^{-3}$ |
| 50 % $Al_2O$; 11 jam | 0,1152 | 1,6969 | 1,4426 | 1,5430 | 41,65 % | 4,17 $g.cm^{-3}$ |

## Lampiran II

## Tabel data konduktivitas ionik

**Konduktivitas ionik 25 % $Al_2O_3$ penahanan 7 jam**

| T (°C) | R (MΩ) | σ (S/cm) |
|---|---|---|
| 30 | 29,29 | $1,32846 \times 10^{-8}$ |
| 35 | 29,26 | $1,32982 \times 10^{-8}$ |
| 40 | 29,19 | $1,33301 \times 10^{-8}$ |
| 45 | 29,15 | $1,33484 \times 10^{-8}$ |
| 50 | 29,13 | $1,33575 \times 10^{-8}$ |
| 55 | 29,19 | $1,33301 \times 10^{-8}$ |
| 60 | 29,1 | $1,33713 \times 10^{-8}$ |
| 65 | 28,89 | $1,34685 \times 10^{-8}$ |
| 70 | 28,84 | $1,34919 \times 10^{-8}$ |
| 75 | 28,75 | $1,35341 \times 10^{-8}$ |
| 80 | 28,77 | $1,35247 \times 10^{-8}$ |
| 85 | 28,65 | $1,35813 \times 10^{-8}$ |
| 90 | 28,64 | $1,35861 \times 10^{-8}$ |
| 95 | 28,54 | $1,36337 \times 10^{-8}$ |
| 100 | 28,54 | $1,36337 \times 10^{-8}$ |
| 105 | 28,56 | $1,36241 \times 10^{-8}$ |
| 110 | 28,33 | $1,37347 \times 10^{-8}$ |
| 115 | 27,01 | $1,4406 \times 10^{-8}$ |
| 120 | 26,91 | $1,44595 \times 10^{-8}$ |
| 125 | 26,7 | $1,45732 \times 10^{-8}$ |
| 130 | 26,58 | $1,4639 \times 10^{-8}$ |
| 135 | 26,14 | $1,48854 \times 10^{-8}$ |
| 140 | 25,61 | $1,51935 \times 10^{-8}$ |
| 145 | 25,45 | $1,5289 \times 10^{-8}$ |
| 150 | 25,13 | $1,54837 \times 10^{-8}$ |
| 155 | 25,3 | $1,53796 \times 10^{-8}$ |

| | | |
|---|---|---|
| 160 | 25,01 | $1,5558 \times 10^{-8}$ |
| 165 | 24,46 | $1,59078 \times 10^{-8}$ |
| 170 | 24,14 | $1,61187 \times 10^{-8}$ |
| 175 | 23,31 | $1,66926 \times 10^{-8}$ |
| 180 | 22,09 | $1,76145 \times 10^{-8}$ |
| 185 | 21,98 | $1,77027 \times 10^{-8}$ |
| 190 | 21,96 | $1,77188 \times 10^{-8}$ |
| 195 | 21,92 | $1,77511 \times 10^{-8}$ |
| 200 | 21,41 | $1,8174 \times 10^{-8}$ |
| 205 | 21,26 | $1,83022 \times 10^{-8}$ |
| 210 | 21,14 | $1,84061 \times 10^{-8}$ |
| 215 | 20,09 | $1,93681 \times 10^{-8}$ |
| 220 | 18,06 | $2,15451 \times 10^{-8}$ |
| 225 | 17,08 | $2,27813 \times 10^{-8}$ |
| 230 | 16,14 | $2,41081 \times 10^{-8}$ |
| 235 | 13,04 | $2,98393 \times 10^{-8}$ |
| 240 | 11,27 | $3,45257 \times 10^{-8}$ |
| 245 | 9,63 | $4,04055 \times 10^{-8}$ |
| 250 | 9,15 | $4,25251 \times 10^{-8}$ |
| 255 | 7,46 | $5,21589 \times 10^{-8}$ |
| 260 | 6,27 | $6,20582 \times 10^{-8}$ |
| 265 | 5,48 | $7,10046 \times 10^{-8}$ |
| 270 | 4,71 | $8,26125 \times 10^{-8}$ |
| 275 | 4 | $9,72763 \times 10^{-8}$ |
| 280 | 3,45 | $1,12784 \times 10^{-7}$ |
| 285 | 2,95 | $1,319 \times 10^{-7}$ |
| 290 | 2,54 | $1,53191 \times 10^{-7}$ |
| 295 | 2,14 | $1,81825 \times 10^{-7}$ |
| 300 | 1,72 | $2,26224 \times 10^{-7}$ |
| 305 | 1,48 | $2,62909 \times 10^{-7}$ |
| 310 | 1,22 | $3,18939 \times 10^{-7}$ |
| 315 | 0,98 | $3,97046 \times 10^{-7}$ |
| 320 | 0,75 | $5,18807 \times 10^{-7}$ |
| 325 | 0,61 | $6,37877 \times 10^{-7}$ |
| 330 | 0,54 | $7,20565 \times 10^{-7}$ |
| 335 | 0,5 | $7,7821 \times 10^{-7}$ |

| | | |
|---|---|---|
| 340 | 0,45 | $8,64678 \times 10^{-7}$ |
| 345 | 0,417 | $9,33106 \times 10^{-7}$ |
| 350 | 0,391 | $9,95154 \times 10^{-7}$ |
| 355 | 0,392 | $9,92615 \times 10^{-7}$ |
| 360 | 0,441 | $8,82324 \times 10^{-7}$ |
| 365 | 0,41 | $9,49037 \times 10^{-7}$ |
| 370 | 0,49 | $7,94092 \times 10^{-7}$ |
| 375 | 0,43 | $9,04895 \times 10^{-7}$ |
| 380 | 0,37 | $1,05164 \times 10^{-6}$ |
| 385 | 0,3 | $1,29702 \times 10^{-6}$ |
| 390 | 0,23 | $1,69176 \times 10^{-6}$ |
| 395 | 0,13 | $2,99312 \times 10^{-6}$ |
| 400 | 0,12 | $3,24254 \times 10^{-6}$ |

**Konduktivitas ionik 25 % $Al_2O_3$ penahanan 9 jam**

| T (°C) | R (MΩ) | σ (S/cm) |
|---|---|---|
| 30 | 28,43 | $1,36864 \times 10^{-8}$ |
| 35 | 28,38 | $1,37105 \times 10^{-8}$ |
| 40 | 27,2 | $1,43053 \times 10^{-8}$ |
| 45 | 27,36 | $1,42217 \times 10^{-8}$ |
| 50 | 27,22 | $1,42948 \times 10^{-8}$ |
| 55 | 27,36 | $1,42217 \times 10^{-8}$ |
| 60 | 27,21 | $1,43001 \times 10^{-8}$ |
| 65 | 27,09 | $1,43634 \times 10^{-8}$ |
| 70 | 27,18 | $1,43159 \times 10^{-8}$ |
| 75 | 27,15 | $1,43317 \times 10^{-8}$ |
| 80 | 27,16 | $1,43264 \times 10^{-8}$ |
| 85 | 26,95 | $1,4438 \times 10^{-8}$ |
| 90 | 26,7 | $1,45732 \times 10^{-8}$ |
| 95 | 26,65 | $1,46006 \times 10^{-8}$ |
| 100 | 26,63 | $1,46115 \times 10^{-8}$ |
| 105 | 26,52 | $1,46721 \times 10^{-8}$ |
| 110 | 26,46 | $1,47054 \times 10^{-8}$ |

| | | |
|---|---|---|
| 115 | 26,49 | $1,46888 \times 10^{-8}$ |
| 120 | 26,31 | $1,47892 \times 10^{-8}$ |
| 125 | 26,19 | $1,4857 \times 10^{-8}$ |
| 130 | 26,09 | $1,4914 \times 10^{-8}$ |
| 135 | 25,36 | $1,53433 \times 10^{-8}$ |
| 140 | 25,34 | $1,53554 \times 10^{-8}$ |
| 145 | 25,19 | $1,54468 \times 10^{-8}$ |
| 150 | 25,1 | $1,55022 \times 10^{-8}$ |
| 155 | 25,11 | $1,5496 \times 10^{-8}$ |
| 160 | 25,18 | $1,54529 \times 10^{-8}$ |
| 165 | 25,09 | $1,55084 \times 10^{-8}$ |
| 170 | 25,15 | $1,54714 \times 10^{-8}$ |
| 175 | 25,11 | $1,5496 \times 10^{-8}$ |
| 180 | 24,94 | $1,56016 \times 10^{-8}$ |
| 185 | 24,78 | $1,57024 \times 10^{-8}$ |
| 190 | 24,5 | $1,58818 \times 10^{-8}$ |
| 195 | 24,17 | $1,60987 \times 10^{-8}$ |
| 200 | 23,97 | $1,6233 \times 10^{-8}$ |
| 205 | 23,46 | $1,65859 \times 10^{-8}$ |
| 210 | 23,05 | $1,68809 \times 10^{-8}$ |
| 215 | 22,81 | $1,70585 \times 10^{-8}$ |
| 220 | 22,51 | $1,72859 \times 10^{-8}$ |
| 225 | 21,83 | $1,78243 \times 10^{-8}$ |
| 230 | 21,37 | $1,8208 \times 10^{-8}$ |
| 235 | 20,18 | $1,92817 \times 10^{-8}$ |
| 240 | 19,17 | $2,02976 \times 10^{-8}$ |
| 245 | 18,19 | $2,13912 \times 10^{-8}$ |
| 250 | 16,76 | $2,32163 \times 10^{-8}$ |
| 255 | 14,64 | $2,65782 \times 10^{-8}$ |
| 260 | 11,68 | $3,33138 \times 10^{-8}$ |
| 265 | 9,64 | $4,03636 \times 10^{-8}$ |
| 270 | 7,76 | $5.01424 \times 10^{-8}$ |
| 275 | 6,84 | $5.68867 \times 10^{-8}$ |
| 280 | 6,37 | $6,1084 \times 10^{-8}$ |
| 285 | 6,02 | $6,46354 \times 10^{-8}$ |
| 290 | 5,69 | $6,8384 \times 10^{-8}$ |

| | | |
|---|---|---|
| 295 | 5,21 | $7,46843 \times 10^{-8}$ |
| 300 | 4,25 | $9,15541 \times 10^{-8}$ |
| 305 | 4,1 | $9,49037 \times 10^{-8}$ |
| 310 | 4,06 | $9,58387 \times 10^{-8}$ |
| 315 | 3,63 | $1,07191 \times 10^{-7}$ |
| 320 | 3,25 | $1,19725 \times 10^{-7}$ |
| 325 | 3,07 | $1,26744 \times 10^{-7}$ |
| 330 | 3,09 | $1,25924 \times 10^{-7}$ |
| 335 | 3,1 | $1,25518 \times 10^{-7}$ |
| 340 | 3,11 | $1,25114 \times 10^{-7}$ |
| 345 | 3,09 | $1,25924 \times 10^{-7}$ |
| 350 | 3,04 | $1,27995 \times 10^{-7}$ |
| 355 | 3,1 | $1,25518 \times 10^{-7}$ |
| 360 | 2,94 | $1,32349 \times 10^{-7}$ |
| 365 | 2,55 | $1,5259 \times 10^{-7}$ |
| 370 | 2,4 | $1,62127 \times 10^{-7}$ |
| 375 | 2,13 | $1,82678 \times 10^{-7}$ |
| 380 | 1,83 | $2,12626 \times 10^{-7}$ |
| 385 | 1,5 | $2,59403 \times 10^{-7}$ |
| 390 | 0,84 | $4,6322 \times 10^{-7}$ |
| 395 | 0,8 | $4,86381 \times 10^{-7}$ |
| 400 | 0,61 | $6,37877 \times 10^{-7}$ |

**Konduktivitas ionik 25 % $Al_2O_3$ penahanan 11 jam**

| T (°C) | R (MΩ) | σ (S/cm) |
|---|---|---|
| 25 | 44,21 | $2,77879 \times 10^{-8}$ |
| 30 | 44,28 | $2,77439 \times 10^{-8}$ |
| 35 | 44,59 | $2,7551 \times 10^{-8}$ |
| 40 | 44,75 | $2,74525 \times 10^{-8}$ |
| 45 | 44,69 | $2,74894 \times 10^{-8}$ |
| 50 | 44,71 | $2,74771 \times 10^{-8}$ |
| 55 | 44,45 | $2,76378 \times 10^{-8}$ |
| 60 | 44,7 | $2,74832 \times 10^{-8}$ |
| 65 | 44,22 | $2,77816 \times 10^{-8}$ |

| | | |
|---|---|---|
| 70 | 44,17 | $2,7813 \times 10^{-8}$ |
| 75 | 44,69 | $2,74894 \times 10^{-8}$ |
| 80 | 44,15 | $2,78256 \times 10^{-8}$ |
| 85 | 44,57 | $2,75634 \times 10^{-8}$ |
| 90 | 44,13 | $2,78382 \times 10^{-8}$ |
| 95 | 43,49 | $2,82479 \times 10^{-8}$ |
| 100 | 43,44 | $2,82804 \times 10^{-8}$ |
| 105 | 43,4 | $2,83065 \times 10^{-8}$ |
| 110 | 43,27 | $2,83915 \times 10^{-8}$ |
| 115 | 43,18 | $2,84507 \times 10^{-8}$ |
| 120 | 43,13 | $2,84837 \times 10^{-8}$ |
| 125 | 43,05 | $2,85366 \times 10^{-8}$ |
| 130 | 42,9 | $2,86364 \times 10^{-8}$ |
| 135 | 42,51 | $2,88991 \times 10^{-8}$ |
| 140 | 42,49 | $2,89127 \times 10^{-8}$ |
| 145 | 42,28 | $2,90563 \times 10^{-8}$ |
| 150 | 42,2 | $2,91114 \times 10^{-8}$ |
| 155 | 42,99 | $2,85764 \times 10^{-8}$ |
| 160 | 42,37 | $2,89946 \times 10^{-8}$ |
| 165 | 41,9 | $2,93198 \times 10^{-8}$ |
| 170 | 41,69 | $2,94675 \times 10^{-8}$ |
| 175 | 41,36 | $2,97026 \times 10^{-8}$ |
| 180 | 40,95 | $3 \times 10^{-8}$ |
| 185 | 40,55 | $3,0296 \times 10^{-8}$ |
| 190 | 40,15 | $3,05978 \times 10^{-8}$ |
| 195 | 40,13 | $3,0613 \times 10^{-8}$ |
| 200 | 38,58 | $3,1843 \times 10^{-8}$ |
| 205 | 35,81 | $3,43061 \times 10^{-8}$ |
| 210 | 35,75 | $3,43637 \times 10^{-8}$ |
| 215 | 35,67 | $3,44407 \times 10^{-8}$ |
| 220 | 35,61 | $3,44988 \times 10^{-8}$ |
| 225 | 35,81 | $3,43061 \times 10^{-8}$ |
| 230 | 34,72 | $3,53831 \times 10^{-8}$ |
| 235 | 34,77 | $3,53322 \times 10^{-8}$ |
| 240 | 34,71 | $3,53933 \times 10^{-8}$ |
| 245 | 34,51 | $3,55984 \times 10^{-8}$ |

| | | |
|---|---|---|
| 250 | 34,19 | $3,59316 \times 10^{-8}$ |
| 255 | 33,31 | $3,68809 \times 10^{-8}$ |
| 260 | 29,1 | $4,22165 \times 10^{-8}$ |
| 265 | 26,65 | $4,60976 \times 10^{-8}$ |
| 270 | 25,98 | $4,72864 \times 10^{-8}$ |
| 275 | 25,7 | $4,78016 \times 10^{-8}$ |
| 280 | 25,41 | $4,83472 \times 10^{-8}$ |
| 285 | 25,33 | $4,84999 \times 10^{-8}$ |
| 290 | 24,36 | $5,04311 \times 10^{-8}$ |
| 295 | 22,8 | $5,38816 \times 10^{-8}$ |
| 300 | 22,76 | $5,39763 \times 10^{-8}$ |
| 305 | 18,15 | $6,7686 \times 10^{-8}$ |
| 310 | 15,76 | $7,79506 \times 10^{-8}$ |
| 315 | 14,89 | $8,25051 \times 10^{-8}$ |
| 320 | 13,09 | $9,38504 \times 10^{-8}$ |
| 325 | 13,02 | $9,43549 \times 10^{-8}$ |
| 330 | 13,08 | $9,39221 \times 10^{-8}$ |
| 335 | 12,39 | $9,91526 \times 10^{-8}$ |
| 340 | 13,41 | $9,16108 \times 10^{-8}$ |
| 345 | 12,99 | $9,45728 \times 10^{-8}$ |
| 350 | 12,96 | $9,47918 \times 10^{-8}$ |
| 355 | 12,93 | $9,50117 \times 10^{-8}$ |
| 360 | 12,54 | $9,79666 \times 10^{-8}$ |
| 365 | 12,41 | $9,89928 \times 10^{-8}$ |
| 370 | 12,57 | $9,77328 \times 10^{-8}$ |
| 375 | 12,88 | $9,53805 \times 10^{-8}$ |
| 380 | 12,76 | $9,62775 \times 10^{-8}$ |
| 385 | 11,98 | $1,02546 \times 10^{-7}$ |
| 390 | 11,97 | $1,02632 \times 10^{-7}$ |
| 395 | 11,96 | $1,02717 \times 10^{-7}$ |
| 400 | 10,2 | $1,20441 \times 10^{-7}$ |

**Konduktivitas ionik 33 % $Al_2O_3$ penahanan 9 jam**

| T (°C) | R (MΩ) | σ (S/cm) |
|---|---|---|
| 30 | 39,65 | $1,29403 \times 10^{-8}$ |
| 35 | 39,78 | $1,2898 \times 10^{-8}$ |
| 40 | 39,45 | $1,30059 \times 10^{-8}$ |
| 45 | 39,55 | $1,2973 \times 10^{-8}$ |
| 50 | 39,58 | $1,29632 \times 10^{-8}$ |
| 55 | 39,54 | $1,29763 \times 10^{-8}$ |
| 60 | 39,66 | $1,29371 \times 10^{-8}$ |
| 65 | 39,62 | $1,29501 \times 10^{-8}$ |
| 70 | 39,61 | $1,29534 \times 10^{-8}$ |
| 75 | 39,71 | $1,29208 \times 10^{-8}$ |
| 80 | 39,67 | $1,29338 \times 10^{-8}$ |
| 85 | 39,5 | $1,29895 \times 10^{-8}$ |
| 90 | 39,48 | $1,2996 \times 10^{-8}$ |
| 95 | 39,76 | $1,29045 \times 10^{-8}$ |
| 100 | 39,66 | $1,29371 \times 10^{-8}$ |
| 105 | 39,75 | $1,29078 \times 10^{-8}$ |
| 110 | 39,65 | $1,29403 \times 10^{-8}$ |
| 115 | 39,78 | $1,2898 \times 10^{-8}$ |
| 120 | 39,72 | $1,29175 \times 10^{-8}$ |
| 125 | 39,74 | $1,2911 \times 10^{-8}$ |
| 130 | 39,68 | $1,29305 \times 10^{-8}$ |
| 135 | 39,58 | $1,29632 \times 10^{-8}$ |
| 140 | 40,06 | $1,28079 \times 10^{-8}$ |
| 145 | 40,85 | $1,25602 \times 10^{-8}$ |
| 150 | 40,02 | $1,28207 \times 10^{-8}$ |
| 155 | 40,11 | $1,27919 \times 10^{-8}$ |
| 160 | 40,98 | $1,25203 \times 10^{-8}$ |
| 165 | 40,68 | $1,26127 \times 10^{-8}$ |
| 170 | 40,88 | $1,2551 \times 10^{-8}$ |
| 175 | 40,75 | $1,2591 \times 10^{-8}$ |
| 180 | 40,72 | $1,26003 \times 10^{-8}$ |
| 185 | 40,96 | $1,25265 \times 10^{-8}$ |
| 190 | 40,87 | $1,2554 \times 10^{-8}$ |

| | | |
|---|---|---|
| 195 | 40,01 | $1,28239 \times 10^{-8}$ |
| 200 | 40,83 | $1,25663 \times 10^{-8}$ |
| 205 | 40,62 | $1,26313 \times 10^{-8}$ |
| 210 | 40,58 | $1,26438 \times 10^{-8}$ |
| 215 | 40,56 | $1,265 \times 10^{-8}$ |
| 220 | 40,49 | $1,26719 \times 10^{-8}$ |
| 225 | 40,44 | $1,26875 \times 10^{-8}$ |
| 230 | 40,68 | $1,26127 \times 10^{-8}$ |
| 235 | 40,79 | $1,25787 \times 10^{-8}$ |
| 240 | 40,86 | $1,25571 \times 10^{-8}$ |
| 245 | 40,87 | $1,2554 \times 10^{-8}$ |
| 250 | 40,84 | $1,25633 \times 10^{-8}$ |
| 255 | 40,72 | $1,26003 \times 10^{-8}$ |
| 260 | 40,86 | $1,25571 \times 10^{-8}$ |
| 265 | 40,98 | $1,25203 \times 10^{-8}$ |
| 270 | 36,28 | $1,41423 \times 10^{-8}$ |
| 275 | 36,29 | $1,41384 \times 10^{-8}$ |
| 280 | 36,4 | $1,40957 \times 10^{-8}$ |
| 285 | 37,4 | $1,37188 \times 10^{-8}$ |
| 290 | 37,41 | $1,37151 \times 10^{-8}$ |
| 295 | 37,68 | $1,36169 \times 10^{-8}$ |
| 300 | 35,71 | $1,43681 \times 10^{-8}$ |
| 305 | 36,01 | $1,42484 \times 10^{-8}$ |
| 310 | 35,93 | $1,42801 \times 10^{-8}$ |
| 315 | 36,01 | $1,42484 \times 10^{-8}$ |
| 320 | 33,41 | $1,53572 \times 10^{-8}$ |
| 325 | 29,24 | $1,75473 \times 10^{-8}$ |
| 330 | 26,25 | $1,9546 \times 10^{-8}$ |
| 335 | 25,79 | $1,98947 \times 10^{-8}$ |
| 340 | 24,68 | $2,07895 \times 10^{-8}$ |
| 345 | 22,82 | $2,24839 \times 10^{-8}$ |
| 350 | 22,81 | $2,24938 \times 10^{-8}$ |
| 355 | 20,13 | $2,54885 \times 10^{-8}$ |
| 360 | 16,07 | $3,1928 \times 10^{-8}$ |
| 365 | 11,23 | $4,56887 \times 10^{-8}$ |
| 370 | 9,98 | $5,14112 \times 10^{-8}$ |

| | | |
|---|---|---|
| 375 | 10,04 | $5,11039 \times 10^{-8}$ |
| 380 | 10,02 | $5,1206 \times 10^{-8}$ |
| 385 | 10,05 | $5,10531 \times 10^{-8}$ |
| 390 | 9,86 | $5,20369 \times 10^{-8}$ |
| 395 | 9,82 | $5,22488 \times 10^{-8}$ |
| 400 | 8,84 | $5,80411 \times 10^{-8}$ |

**Konduktivitas ionik 33 % $Al_2O_3$ penahanan 11 jam**

| T (°C) | R (MΩ) | σ (S/cm) |
|---|---|---|
| 30 | 92,57 | $1,04778 \times 10^{-8}$ |
| 35 | 102,72 | $9,44249 \times 10^{-9}$ |
| 40 | 106,13 | $9,13909 \times 10^{-9}$ |
| 45 | 108,26 | $8,95928 \times 10^{-9}$ |
| 50 | 107,29 | $9,04028 \times 10^{-9}$ |
| 55 | 104,33 | $9,29677 \times 10^{-9}$ |
| 60 | 101,42 | $9,56352 \times 10^{-9}$ |
| 65 | 103,91 | $9,33435 \times 10^{-9}$ |
| 70 | 102,45 | $9,46737 \times 10^{-9}$ |
| 75 | 101,13 | $9,59094 \times 10^{-9}$ |
| 80 | 100,87 | $9,61566 \times 10^{-9}$ |
| 85 | 101,35 | $9,57012 \times 10^{-9}$ |
| 90 | 100,41 | $9,65972 \times 10^{-9}$ |
| 95 | 100,71 | $9,63094 \times 10^{-9}$ |
| 100 | 101,16 | $9,5881 \times 10^{-9}$ |
| 105 | 102,2 | $9,49053 \times 10^{-9}$ |
| 110 | 100,89 | $9,61376 \times 10^{-9}$ |
| 115 | 100,99 | $9,60424 \times 10^{-9}$ |
| 120 | 100,76 | $9,62616 \times 10^{-9}$ |
| 125 | 101,13 | $9,59094 \times 10^{-9}$ |
| 130 | 101,72 | $9,53531 \times 10^{-9}$ |
| 135 | 100,94 | $9,609 \times 10^{-9}$ |
| 140 | 101,33 | $9,57201 \times 10^{-9}$ |
| 145 | 100,72 | $9,62999 \times 10^{-9}$ |
| 150 | 100,62 | $9,63956 \times 10^{-9}$ |

| | | |
|---|---|---|
| 155 | 99,84 | $9{,}71486 \times 10^{-9}$ |
| 160 | 99,06 | $9{,}79136 \times 10^{-9}$ |
| 165 | 98,41 | $9{,}85603 \times 10^{-9}$ |
| 170 | 97,42 | $9{,}95619 \times 10^{-9}$ |
| 175 | 97,4 | $9{,}95824 \times 10^{-9}$ |
| 180 | 96,3 | $1{,}0072 \times 10^{-8}$ |
| 185 | 95,13 | $1{,}01959 \times 10^{-8}$ |
| 190 | 93,37 | $1{,}0388 \times 10^{-8}$ |
| 195 | 90,18 | $1{,}07555 \times 10^{-8}$ |
| 200 | 89,19 | $1{,}08749 \times 10^{-8}$ |
| 205 | 86,16 | $1{,}12573 \times 10^{-8}$ |
| 210 | 83,96 | $1{,}15523 \times 10^{-8}$ |
| 215 | 81,96 | $1{,}18342 \times 10^{-8}$ |
| 220 | 78,4 | $1{,}23716 \times 10^{-8}$ |
| 225 | 75,93 | $1{,}2774 \times 10^{-8}$ |
| 230 | 74,43 | $1{,}30315 \times 10^{-8}$ |
| 235 | 72,85 | $1{,}33141 \times 10^{-8}$ |
| 240 | 70,59 | $1{,}37404 \times 10^{-8}$ |
| 245 | 67,22 | $1{,}44292 \times 10^{-8}$ |
| 250 | 62,34 | $1{,}55587 \times 10^{-8}$ |
| 255 | 59,34 | 1,63453E-08 |
| 260 | 55,94 | $1{,}73388 \times 10^{-8}$ |
| 265 | 51,74 | $1{,}87463 \times 10^{-8}$ |
| 270 | 46,01 | $2{,}10809 \times 10^{-8}$ |
| 275 | 40,59 | $2{,}38958 \times 10^{-8}$ |
| 280 | 35,15 | $2{,}75941 \times 10^{-8}$ |
| 285 | 30,29 | $3{,}20215 \times 10^{-8}$ |
| 290 | 25,79 | $3{,}76088 \times 10^{-8}$ |
| 295 | 21,72 | $4{,}46562 \times 10^{-8}$ |
| 300 | 18,71 | $5{,}1840 \times 10^{-8}$ |
| 305 | 16,66 | $5{,}82192 \times 10^{-8}$ |
| 310 | 14,93 | $6{,}49653 \times 10^{-8}$ |
| 315 | 13,66 | $7{,}10053 \times 10^{-8}$ |
| 320 | 12,6 | $7{,}69787 \times 10^{-8}$ |
| 325 | 11,78 | $8{,}23372 \times 10^{-8}$ |
| 330 | 11 | $8{,}8175 \times 10^{-8}$ |

| | | |
|---|---|---|
| 335 | 10,2 | $9,50914 \times 10^{-8}$ |
| 340 | 9,3 | $1,04294 \times 10^{-7}$ |
| 345 | 8,69 | $1,11615 \times 10^{-7}$ |
| 350 | 8,38 | $1,15744 \times 10^{-7}$ |
| 355 | 8,44 | $1,14921 \times 10^{-7}$ |
| 360 | 8,71 | $1,11358 \times 10^{-7}$ |
| 365 | 8,91 | $1,08859 \times 10^{-7}$ |
| 370 | 8,76 | $1,10723 \times 10^{-7}$ |
| 375 | 8,49 | $1,14244 \times 10^{-7}$ |
| 380 | 8,13 | $1,19303 \times 10^{-7}$ |
| 385 | 7,74 | $1,25314 \times 10^{-7}$ |
| 390 | 7,34 | $1,32143 \times 10^{-7}$ |
| 395 | 6,9 | $1,4057 \times 10^{-7}$ |
| 400 | 6,429 | $1,50868 \times 10^{-7}$ |

**Konduktivitas ionik 50 % $Al_2O_3$ penahanan 11 jam**

| T (°C) | R (MΩ) | σ (S/cm) |
|---|---|---|
| 30 | 36,3 | $3,2913 \times 10^{-8}$ |
| 35 | 38,79 | $3,08 \times 10^{-8}$ |
| 40 | 38,31 | $3,1186 \times 10^{-8}$ |
| 45 | 38,72 | $3,0856 \times 10^{-8}$ |
| 50 | 38,21 | $3,1268 \times 10^{-8}$ |
| 55 | 38,17 | $3,1301 \times 10^{-8}$ |
| 60 | 33,26 | $3,5921 \times 10^{-8}$ |
| 65 | 32,99 | $3,6215 \times 10^{-8}$ |
| 70 | 32,86 | $3,6359 \times 10^{-8}$ |
| 75 | 32,93 | $3,6281 \times 10^{-8}$ |
| 80 | 33,2 | $3,5986 \times 10^{-8}$ |
| 85 | 33,05 | $3,615 \times 10^{-8}$ |
| 90 | 33,3 | $3,5878 \times 10^{-8}$ |
| 95 | 33,97 | $3,5171 \times 10^{-8}$ |
| 100 | 34,04 | $3,5098 \times 10^{-8}$ |
| 105 | 34 | $3,514 \times 10^{-8}$ |
| 110 | 34,45 | $3,468 \times 10^{-8}$ |

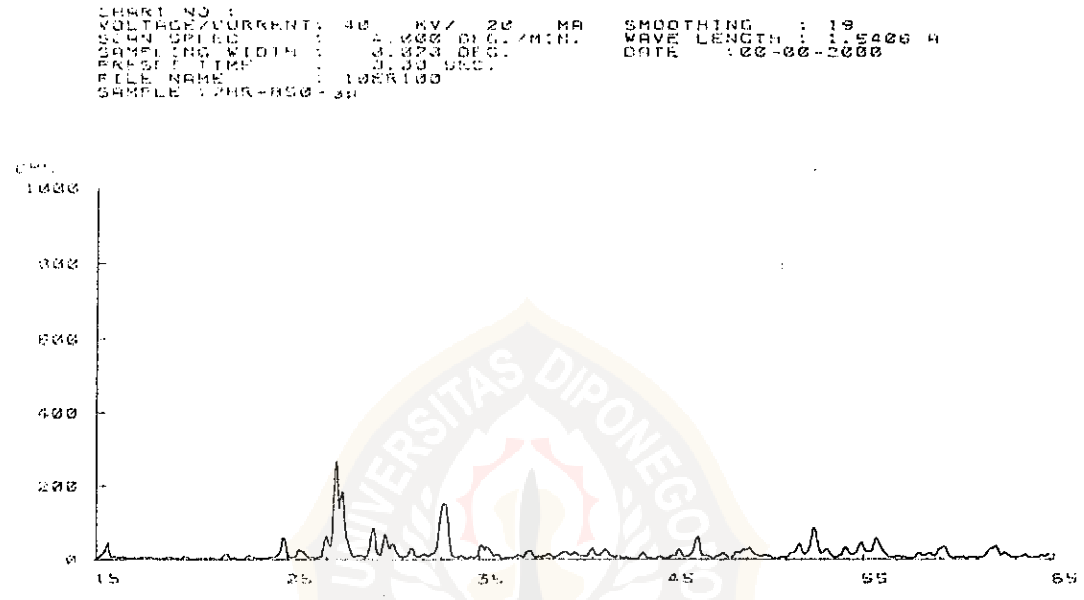
| | | |
|---|---|---|
| 115 | 34,37 | $3,4761 \times 10^{-8}$ |
| 120 | 34,39 | $3,4741 \times 10^{-8}$ |
| 125 | 34,68 | $3,445 \times 10^{-8}$ |
| 130 | 34,31 | $3,4822 \times 10^{-8}$ |
| 135 | 34,4 | $3,4731 \times 10^{-8}$ |
| 140 | 34,66 | $3,447 \times 10^{-8}$ |
| 145 | 34,24 | $3,4893 \times 10^{-8}$ |
| 150 | 34,42 | $3,4711 \times 10^{-8}$ |
| 155 | 34,6 | $3,453 \times 10^{-8}$ |
| 160 | 34,6 | $3,453 \times 10^{-8}$ |
| 165 | 34,65 | $3,448 \times 10^{-8}$ |
| 170 | 34,73 | $3,4401 \times 10^{-8}$ |
| 175 | 34,91 | $3,4224 \times 10^{-8}$ |
| 180 | 34,97 | $3,4165 \times 10^{-8}$ |
| 185 | 34,09 | $3,5047 \times 10^{-8}$ |
| 190 | 34,83 | $3,4302 \times 10^{-8}$ |
| 195 | 35,09 | $3,4048 \times 10^{-8}$ |
| 200 | 35,31 | $3,3836 \times 10^{-8}$ |
| 205 | 35,2 | $3,3942 \times 10^{-8}$ |
| 210 | 35,47 | $3,3683 \times 10^{-8}$ |
| 215 | 35,53 | $3,3626 \times 10^{-8}$ |
| 220 | 35,56 | $3,3598 \times 10^{-8}$ |
| 225 | 35,54 | $3,3617 \times 10^{-8}$ |
| 230 | 35,82 | $3,3354 \times 10^{-8}$ |
| 235 | 35,88 | $3,3298 \times 10^{-8}$ |
| 240 | 35,97 | $3,3215 \times 10^{-8}$ |
| 245 | 36,21 | $3,2995 \times 10^{-8}$ |
| 250 | 36,29 | $3,2922 \times 10^{-8}$ |
| 255 | 36,31 | $3,2904 \times 10^{-8}$ |
| 260 | 36,21 | $3,2995 \times 10^{-8}$ |
| 265 | 36,21 | $3,2995 \times 10^{-8}$ |
| 270 | 36,38 | $3,2841 \times 10^{-8}$ |
| 275 | 36,83 | $3,2439 \times 10^{-8}$ |
| 280 | 36,2 | $3,3004 \times 10^{-8}$ |
| 285 | 36,91 | $3,2369 \times 10^{-8}$ |
| 290 | 37,12 | $3,2186 \times 10^{-8}$ |

| | | |
|---|---|---|
| 295 | 36,57 | $3,267 \times 10^{-8}$ |
| 300 | 36,61 | $3,2634 \times 10^{-8}$ |
| 305 | 36,84 | $3,2431 \times 10^{-8}$ |
| 310 | 36,41 | $3,2814 \times 10^{-8}$ |
| 315 | 37,03 | $3,2264 \times 10^{-8}$ |
| 320 | 37 | $3,229 \times 10^{-8}$ |
| 325 | 36,57 | $3,267 \times 10^{-8}$ |
| 330 | 36,28 | $3,2931 \times 10^{-8}$ |
| 335 | 36,8 | $3,2466 \times 10^{-8}$ |
| 340 | 36,38 | $3,2841 \times 10^{-8}$ |
| 345 | 36,57 | $3,267 \times 10^{-8}$ |
| 350 | 37,38 | $3,1962 \times 10^{-8}$ |
| 355 | 38,3 | $3,1194 \times 10^{-8}$ |
| 360 | 39,19 | $3,0486 \times 10^{-8}$ |
| 365 | 39,88 | $2,9958 \times 10^{-8}$ |
| 370 | 40,36 | $2,9602 \times 10^{-8}$ |
| 375 | 40,52 | $2,9485 \times 10^{-8}$ |
| 380 | 40,41 | $2,9566 \times 10^{-8}$ |
| 385 | 39,49 | $3,025 \times 10^{-8}$ |
| 390 | 37,33 | $3,2005 \times 10^{-8}$ |
| 395 | 33,96 | $3,5181 \times 10^{-8}$ |
| 400 | 28,83 | $4,1441 \times 10^{-8}$ |
| 405 | 26,56 | $4,4983 \times 10^{-8}$ |
| 410 | 24 | $4,9781 \times 10^{-8}$ |
| 415 | 22,01 | $5,4282 \times 10^{-8}$ |

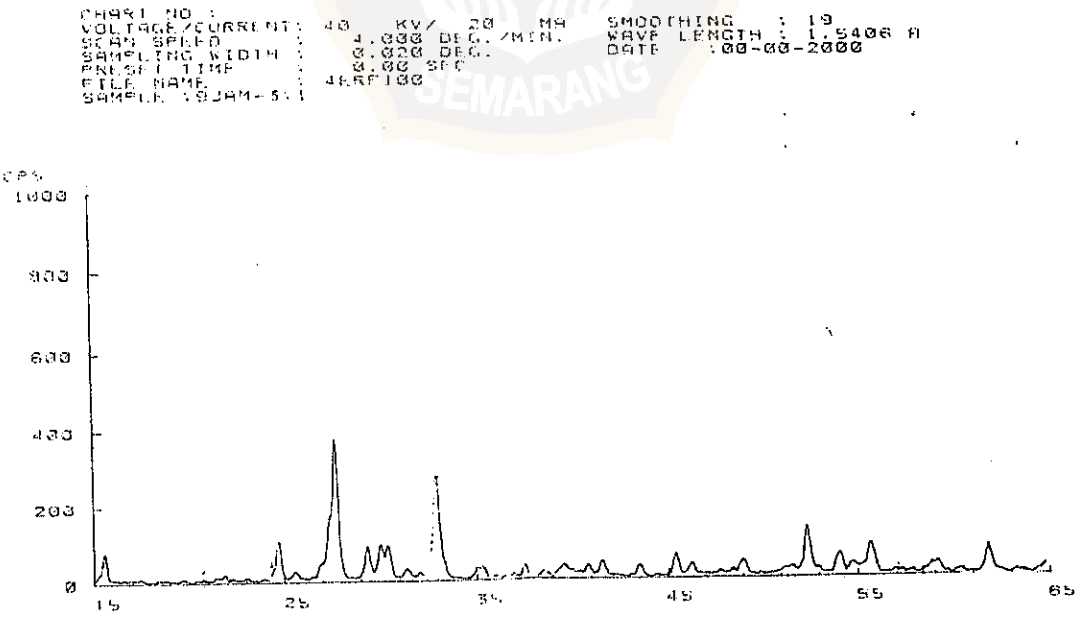
## Lampiran III

## Hasil XRD

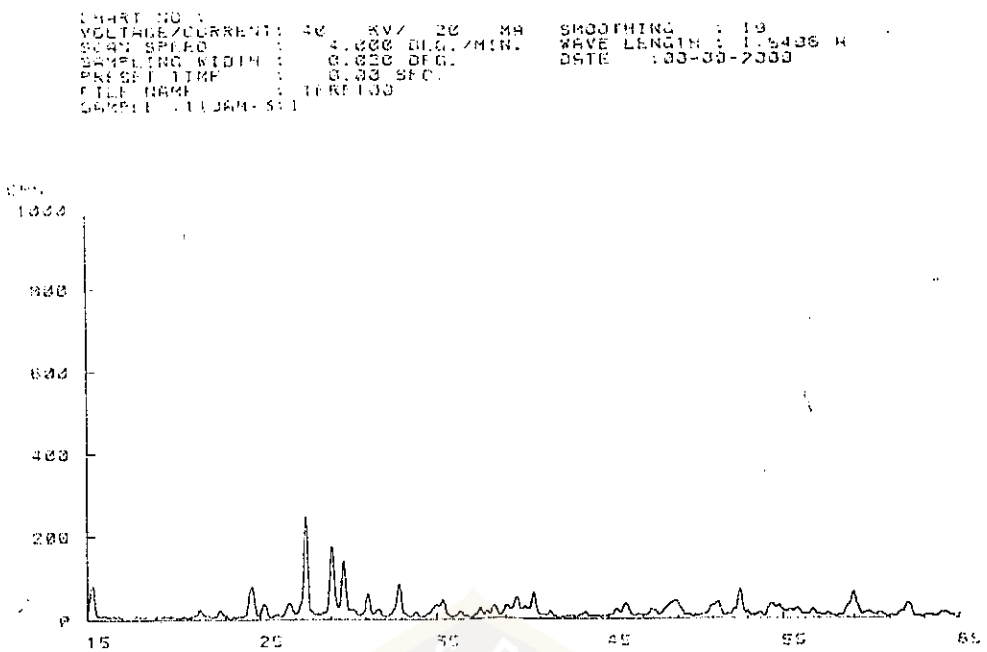
### Grafik XRD 25 % $Al_2O_3$ penahanan 7 jam



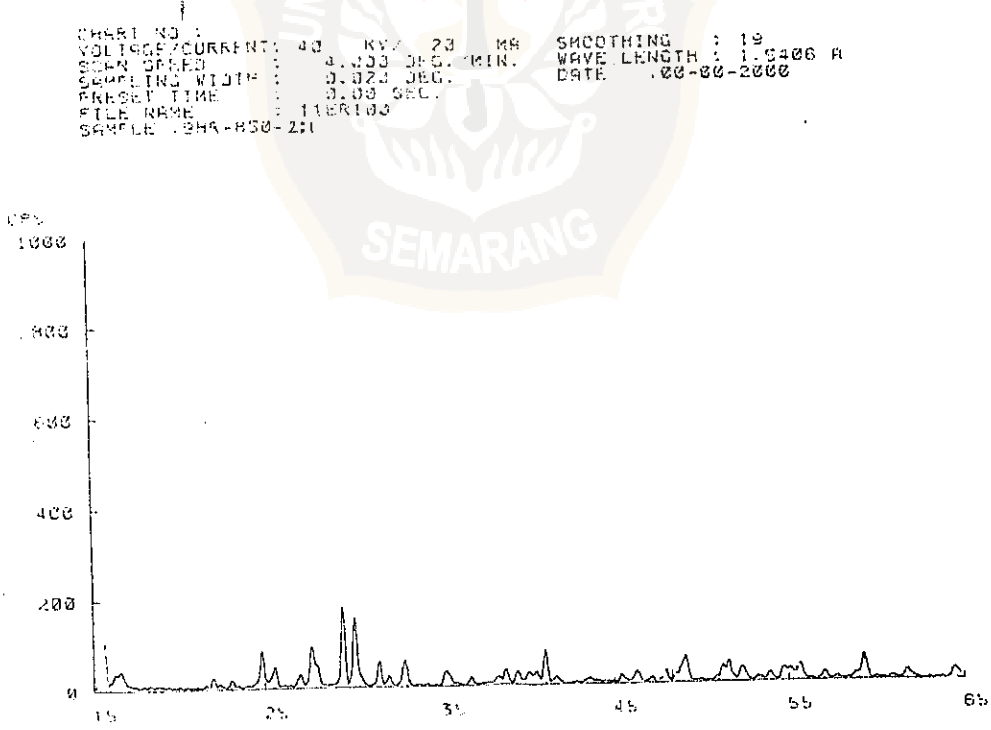

### Grafik XRD 25 % $Al_2O_3$ penahanan 9 jam



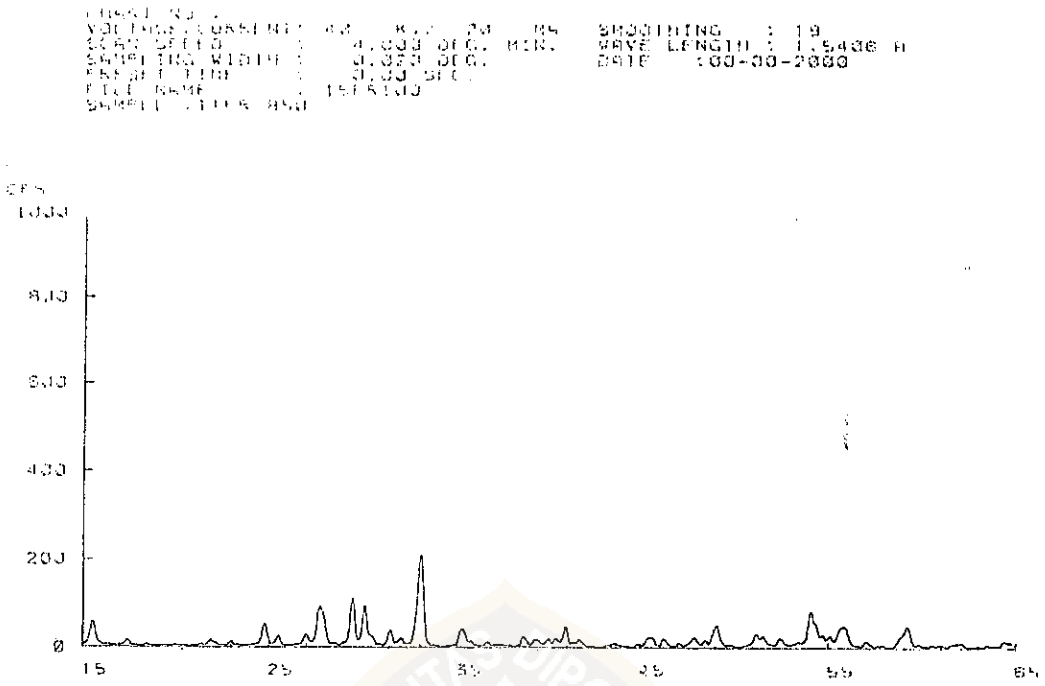
**Grafik XRD 25 % $Al_2O_3$ penahanan 11 jam**



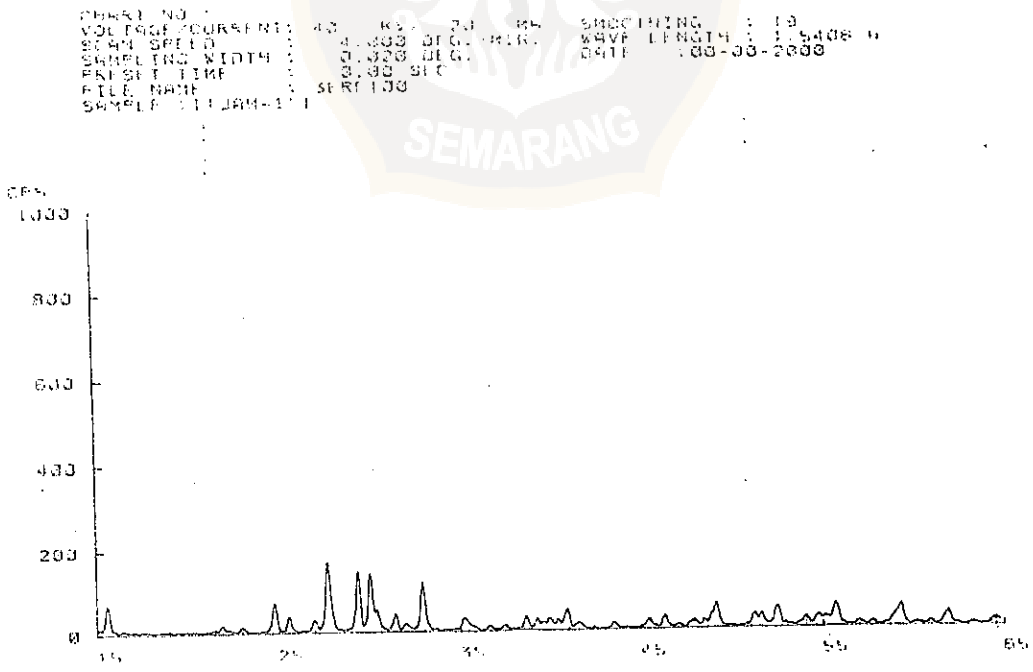

**Grafik XRD 33 % $Al_2O_3$ penahanan 9 jam**



**Grafik XRD 33 % $Al_2O_3$ penahanan 11 jam**




**Grafik XRD 50 % $Al_2O_3$ penahanan 11 jam**



**25 % $Al_2O_3$ penahanan 7 jam**

| 2θ | d | Keterangan |
|---|---|---|
| 27,21 | 3,275 | δ-$Bi_2O_3$ |
| 27,72 | 3,215 | $Bi_{24}Al_2O_{39}$ |
| 32,99 | 2,712 | $Bi_{24}Al_2O_{39}$ |
| 29,27 | 3,031 | $Al_4Bi_2O_9$ |
| 31,58 | 2,831 | |
| 29,91 | 2,972 | $Al_4Bi_2O_9$ |
| 26,82 | 3,321 | |
| 24,64 | 3,616 | |
| 55,48 | 1,712 | δ-$Bi_2O_3$ |
| 46,23 | 2,001 | δ-$Bi_2O_3$ |

**25 % $Al_2O_3$ penahanan 9 jam**

| 2θ | d | Keterangan |
|---|---|---|
| 27,75 | 3,251 | γ-$Bi_2O_3$ |
| 33 | 2,742 | γ-$Bi_2O_3$ |
| 52,25 | 1,763 | γ-$Bi_2O_3$ |
| 24,50 | 3,630 | |

| | | |
|---|---|---|
| 29,25 | 3,032 | $Al_4Bi_2O_9$ |
| 29,75 | 3,001 | |
| 30,25 | 2,971 | $Al_4Bi_2O_9$ |
| 55,5 | 1,654 | |
| 15,5 | 5,680 | $Al_4Bi_2O_9$ |
| 61,5 | 1,506 | |

**25 % $Al_2O_3$ penahanan 11 jam**

| 2θ | d | Keterangan |
|---|---|---|
| 27,75 | 3,25 | γ-$Bi_2O_3$ |
| 29 | 3,03 | $Al_4Bi_2O_9$ |
| 29,75 | 2,97 | $Al_4Bi_2O_9$ |
| 32,75 | 2,74 | γ-$Bi_2O_3$ |
| 15,64 | 5,68 | $Al_4Bi_2O_9$ |
| 24,5 | 3,63 | |
| 52,5 | 1,76 | γ-$Bi_2O_3$ |
| 31 | 2,88 | |
| 40,75 | 2,21 | |
| 59 | 1,56 | |

**33 % $Al_2O_3$ penahanan 9 jam**

| 2θ | d | Keterangan |
|---|---|---|
| 29,39 | 3,03 | $Al_4Bi_2O_9$ |
| 30,04 | 2.97 | $Al_4Bi_2O_9$ |
| 15,64 | 5,68 | $Al_4Bi_2O_9$ |
| 27,72 | 3,25 | γ-$Bi_2O_3$ |
| 24,89 | 0,21 | |
| 40,96 | 0,35 | |
| 31,45 | 0,27 | |
| 32,73 | 2,74 | γ-$Bi_2O_3$ |
| 49,06 | 1,76 | γ-$Bi_2O_3$ |
| 58,95 | 0,49 | |

**33 % $Al_2O_3$ penahanan 11 jam**

| 2θ | d | Keterangan |
|---|---|---|
| 33 | 2,71 | |
| 29,37 | 3,03 | $Al_4Bi_2O_9$ |
| 30 | 2,97 | $Al_4Bi_2O_9$ |
| 27,68 | 3,14 | β-$Bi_2O_3$ |
| 54 | 1,64 | β-$Bi_2O_3$ |

| | | |
|---|---|---|
| 15,56 | 5,68 | $Al_4Bi_2O_9$ |
| 24,75 | 3,59 | |
| 49 | 1,94 | $\beta$-$Bi_2O_3$ |
| 55,75 | 1,64 | |
| 59,12 | 1,56 | |

**50 % $Al_2O_3$ penahanan 11 jam**

| 2θ | d | Keterangan |
|---|---|---|
| 27,75 | 3,19 | $\beta$-$Bi_2O_3$ |
| 29,25 | 3,03 | $Al_4Bi_2O_9$ |
| 30 | 2,97 | $Al_4Bi_2O_9$ |
| 33 | 2,71 | $Al_2Bi_{24}O_{39}$ |
| 24,75 | 3,59 | |
| 15,50 | 5,68 | $Al_4Bi_2O_9$ |
| 49 | 1,96 | $\beta$-$Bi_2O_3$ |
| 55,5 | 1,69 | $\beta$-$Bi_2O_3$ |
| 59 | 1,54 | |
| 52,25 | 1,75 | $Al_2Bi_{24}O_{39}$ |

16-0654 Wavelength= 1.54434

δ-Bi2O3

Bismuth Oxide

Rad.: CuKa2 λ: 1.54434 Filter: d-sp:

Cut off: Int.: Estimation I/Icor.:

Ref: Gattow, Schroder, Z. Anorg. Allg. Chem., 318, 176 (1962)

Sys.: Cubic S.G.: Fm3m (225)

a: 5.66 b: c: A: C:

α: β: γ: Z: 2.4 mp:

Ref: Ibid.

Dx: 10.241 Dm: SS/FOM: $F_{12}$ = 7(0.131 , 13)

| d(A) | Int | h | k | l |
|---|---|---|---|---|
| 3.27 | 100 | 1 | 1 | 1 |
| 2.83 | 45 | 2 | 0 | 0 |
| 2.00 | 65 | 2 | 2 | 0 |
| 1.71 | 70 | 3 | 1 | 1 |
| 1.63 | 18 | 2 | 2 | 2 |
| 1.42 | 10 | 4 | 0 | 0 |
| 1.30 | 25 | 3 | 3 | 1 |
| 1.27 | 20 | 4 | 2 | 0 |
| 1.16 | 18 | 4 | 2 | 2 |
| 1.09 | 16 | 5 | 1 | 1 |
| .95 | 18 | 5 | 3 | 1 |
| .94 | 8 | 6 | 0 | 0 |

Pattern taken at 750 C. CAS #: 1304-76-3. Ca F2 type. PSC: cF12. Mwt: 465.96. Volume[CD]: 181.32.



45-1344 Wavelength= 1.5405981

δ-Bi2O3

Bismuth Oxide

Rad.: CuKa1 λ: 1.540598 Filter: Ge Mono d-sp: Diff.

Cut off: Int.: Diffract. I/Icor.: 4.7

Ref: Wies, S., Eysel, W., Mineral.-Petrographisches Inst., Univ. Heidelberg, Germany, ICDD Grant-in-Aid, (1991)

Sys.: Cubic S.G.: I23 (197)

a: 10.2670(2) b: c: A: C:

α: β: γ: Z: 13 mp:

Ref: Harwig, H., Z. Anorg. Allg. Chem., 444, 151 (1978)

Dx: 9.294 Dm: SS/FOM: $F_{30}$ = 160(.0049 , 38)

Color: Greenish yellow
Prepared by Bi2 O3 (Aldrich, 99.999%) heated in a sealed Au tube to 850 C, cooled with 2 K per minute to 630 C and quenched in liquid N2. Lattice parameter in good agreement with the value 10.268, given by Levin, Roth, J. Res. Nat. Bur. Stand., Sect. A, 68 189-195 (1984). Metastable phase, Bi2 O3 type. Silicon used as an internal stand. PSC: cI65. Mwt: 465.96. Volume[CD]: 1082.26.

| d(A) | Int | h | k | l | d(A) | Int | h | k | l |
|---|---|---|---|---|---|---|---|---|---|
| 5.136 | 2 | 2 | 0 | 0 | 1.1625 | 1 | 7 | 5 | 2 |
| 4.191 | 2 | 2 | 1 | 1 | 1.1481 | 1 | 8 | 4 | 0 |
| 3.629 | 12 | 2 | 2 | 0 | 1.1338 | 2 | 8 | 3 | 3 |
| 3.246 | 100 | 3 | 1 | 0 | 1.1203 | 3 | 8 | 4 | 2 |
| 2.9642 | 40 | 2 | 2 | 2 | 1.1071 | 3 | 7 | 6 | 1 |
| 2.7440 | 80 | 3 | 2 | 1 | 1.0946 | 2 | 6 | 6 | 4 |
| 2.5669 | 3 | 4 | 0 | 0 | | | | | |
| 2.4197 | 4 | 3 | 3 | 0 | | | | | |
| 2.2955 | 8 | 4 | 2 | 0 | | | | | |
| 2.1892 | 20 | 3 | 3 | 2 | | | | | |
| 2.0958 | 16 | 4 | 2 | 2 | | | | | |
| 2.0137 | 18 | 4 | 3 | 1 | | | | | |
| 1.8746 | 2 | 5 | 2 | 1 | | | | | |
| 1.7607 | 50 | 4 | 3 | 3 | | | | | |
| 1.7111 | 12 | 4 | 4 | 2 | | | | | |
| 1.6656 | 25 | 5 | 3 | 2 | | | | | |
| 1.5478 | 2 | 6 | 2 | 2 | | | | | |
| 1.5137 | 25 | 6 | 3 | 1 | | | | | |
| 1.4520 | 9 | 5 | 4 | 3 | | | | | |
| 1.4237 | 4 | 6 | 4 | 0 | | | | | |
| 1.3970 | 4 | 7 | 2 | 1 | | | | | |
| 1.3720 | 1 | 6 | 4 | 2 | | | | | |
| 1.3481 | 1 | 7 | 3 | 0 | | | | | |
| 1.3038 | 2 | 7 | 3 | 2 | | | | | |
| 1.2635 | 1 | 5 | 5 | 4 | | | | | |
| 1.2270 | 10 | 6 | 5 | 3 | | | | | |
| 1.2101 | 9 | 8 | 2 | 2 | | | | | |
| 1.1935 | 8 | 7 | 5 | 0 | | | | | |

25-1048 Wavelength= 1.54056

Al4Bi2O9

Aluminum Bismuth Oxide

Rad.: Cu λ: 1.54056 Filter: Mono d-sp:

Cut off: Int.: Diffract. I/Icor.: 3.10

Ref: Natl. Bur. Stand. (U.S.) Monogr. 25, 11, 5 (1971)

Sys.: Orthorhombic S.G.: Pbam (55)

a: 7.719(1) b: 8.109(1) c: 5.6919(8) A: 0.9519 C: 0.7019

α: β: γ: Z: 2 mp:

Ref: Ibid., Natl. Bur. Stand. (U.S.) Monogr. 25

Dx: 6.244 Dm: SS/FOM: $F_{30}$ = 69(.0115 , 38)

Color: Light yellow

The sample was prepared by heating a mixture of α-Al2 O3 and Bi2 O3 in a 2:1 molar ratio at 1000 C. This was followed by grinding and reheating. Pattern at 25 C. Bi2 Ga4 O9 type. Silver used as an internal stand. PSC: oP30. To replace 23-1006. Mwt: 669.88. Volume[CD]: 356.28.

| d(A) | Int | h | k | l | d(A) | Int | h | k | l |
|---|---|---|---|---|---|---|---|---|---|
| 5.68 | 75 | 0 | 0 | 1 | 1.898 | 10 | 0 | 0 | 3 |
| 4.055 | 12 | 0 | 2 | 0 | 1.878 | 7 | 4 | 1 | 0 |
| 3.989 | 5 | 1 | 1 | 1 | 1.864 | 15 | 3 | 3 | 0 |
| 3.862 | 10 | 2 | 0 | 0 | 1.857 | 16 | 3 | 1 | 2 |
| 3.591 | 35 | 1 | 2 | 0 | 1.854 | 25 | 1 | 4 | 1 |
| 3.485 | 25 | 2 | 1 | 0 | 1.827 | 1 | 4 | 0 | 1 |
| 3.301 | 19 | 0 | 2 | 1 | 1.795 | 3 | 2 | 4 | 0 |
| 3.192 | 20 | 2 | 0 | 1 | 1.783 | 16 | 4 | 1 | 1 |
| 3.034 | 100 | 1 | 2 | 1 | 1.771 | 17 | 3 | 3 | 1 |
| 2.971 | 85 | 2 | 1 | 1 | 1.743 | 3 | 4 | 2 | 0 |
| 2.846 | 30 | 0 | 0 | 2 | 1.726 | 1 | 3 | 2 | 2 |
| 2.795 | 12 | 2 | 2 | 0 | 1.719 | 2 | 0 | 2 | 3 |
| 2.551 | 15 | 1 | 3 | 0 | 1.703 | 2 | 2 | 0 | 3 |
| 2.537 | 14 | 1 | 1 | 2 | 1.677 | 14 | 1 | 2 | 3 |
| 2.510 | 3 | 2 | 2 | 1 | 1.666 | 13 | 4 | 2 | 1 |
| 2.453 | 9 | 3 | 1 | 0 | 1.652 | 5 | 0 | 4 | 2 |
| 2.328 | 16 | 1 | 3 | 1 | 1.615 | 7 | 1 | 4 | 2 |
| 2.290 | 14 | 2 | 0 | 2 | 1.597 | 5 | 4 | 0 | 2 |
| 2.252 | 11 | 3 | 1 | 1 | 1.567 | 9 | 4 | 1 | 2 |
| 2.230 | 12 | 1 | 2 | 2 | 1.559 | 25 | 3 | 3 | 2 |
| 2.204 | 35 | 2 | 1 | 2 | 1.528 | 1 | 1 | 5 | 1 |
| 2.028 | 1 | 0 | 4 | 0 | 1.522 | 2 | 1 | 3 | 3 |
| 1.994 | 1 | 2 | 2 | 2 | 1.500 | 2 | 3 | 1 | 3 |
| 1.961 | 12 | 1 | 4 | 0 | 1.495 | 2 | 2 | 5 | 0 |
| 1.930 | 3 | 4 | 0 | 0 | 1.466 | 1 | 5 | 1 | 1 |
| 1.908 | 2 | 0 | 4 | 1 | 1.4465 | 6 | 2 | 5 | 1 |

| d(A) | Int | h | k | l |
|---|---|---|---|---|
| 1.4233 | 5 | 0 | 0 | 4 |
| 1.3989 | 6 | 5 | 2 | 1 |
| 1.3865 | 3 | 1 | 5 | 2 |
| 1.3722 | 2 | 3 | 5 | 0 |
| 1.3638 | 5 | 1 | 4 | 3 |



2-0184 Wavelength= 1.5406

124Al2O39

luminum Bismuth Oxide

ad.: CuKa1 λ: 1.5406 Filter: Ni Beta d-sp: Diff.

ut off: Int.: Diffract. I/Icor.: 7.9

ef: Troemel, M., Delicat, U., Ducke, J., Muench, E., Inst. norg. Chem., Frankfurt, Germany, ICDD Grant-in-Aid, (1991)

ys.: Cubic S.G.: I23 (197)

10.179 b: c: A: C:

β: γ: Z: 1 mp:

ef: Levin, E., Roth, R., J. Res. Natl. Bur. Stand., Sect. A. 3, 197 (1964)

x: 8.964 Dm: SS/FOM: $F_{30}$ = 79(.0122 , 31)

olor: Light brown

repared by heating oxides at 700 C for 115 hours. 26 metal toms per cell. Sillenite, Bi12 O20 Si type. Also called: -\Bi2 O3\.PSC: cI65. To replace 23-1005. Mwt: 5693.47 olume[CD]: 1054.67.

| d(A) | Int | h | k | l | d(A) | Int | h | k | l |
|---|---|---|---|---|---|---|---|---|---|
| 5.09 | 1 | 2 | 0 | 0 | 1.360 | 2 | 6 | 4 | 2 |
| 4.16 | 2 | 2 | 1 | 1 | 1.337 | 2 | 7 | 3 | 0 |
| 3.60 | 18 | 2 | 2 | 0 | 1.293 | 6 | 7 | 3 | 2 |
| 3.219 | 100 | 3 | 1 | 0 | 1.272 | 1 | 8 | 0 | 0 |
| 2.938 | 24 | 2 | 2 | 2 | 1.253 | 3 | 8 | 1 | 1 |
| 2.720 | 72 | 3 | 2 | 1 | 1.235 | 2 | 8 | 2 | 0 |
| 2.545 | 4 | 4 | 0 | 0 | 1.217 | 16 | 6 | 5 | 3 |
| 2.399 | 7 | 4 | 1 | 1 | 1.1998 | 14 | 8 | 2 | 2 |
| 2.275 | 9 | 4 | 2 | 0 | 1.1834 | 12 | 7 | 4 | 3 |
| 2.170 | 13 | 3 | 3 | 2 | 1.1676 | <1 | 6 | 6 | 2 |
| 2.078 | 12 | 4 | 2 | 2 | 1.1527 | 3 | 7 | 5 | 2 |
| 1.996 | 16 | 4 | 3 | 1 | 1.1381 | 1 | 8 | 4 | 0 |
| 1.859 | 7 | 5 | 2 | 1 | 1.1241 | 4 | 9 | 1 | 0 |
| 1.799 | 1 | 4 | 4 | 0 | 1.1107 | 4 | 8 | 4 | 2 |
| 1.746 | 41 | 5 | 3 | 0 | 1.0976 | 7 | 7 | 6 | 1 |
| 1.696 | 21 | 6 | 0 | 0 | 1.0852 | 1 | 6 | 6 | 4 |
| 1.651 | 31 | 6 | 1 | 1 | 1.0731 | 5 | 9 | 3 | 0 |
| 1.609 | 1 | 6 | 2 | 0 | 1.0499 | 2 | 9 | 3 | 2 |
| 1.571 | 4 | 5 | 4 | 1 | 1.0391 | <1 | 8 | 4 | 4 |
| 1.535 | 4 | 6 | 2 | 2 | 1.0283 | 12 | 7 | 7 | 0 |
| 1.501 | 22 | 6 | 3 | 1 | 1.0179 | 2 | 10 | 0 | 0 |
| 1.469 | 2 | 4 | 4 | 4 | 1.0078 | 1 | 7 | 7 | 2 |
| 1.439 | 9 | 7 | 1 | 0 | .9981 | 3 | 8 | 6 | 2 |
| 1.412 | 3 | 6 | 4 | 0 | .9886 | 5 | 9 | 4 | 3 |
| 1.385 | 6 | 5 | 5 | 2 | .9796 | 2 | 10 | 2 | 2 |

| d(A) | Int | h | k | l |
|---|---|---|---|---|
| .9705 | 6 | 10 | 3 | 1 |
| .9533 | 2 | 8 | 5 | 5 |



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