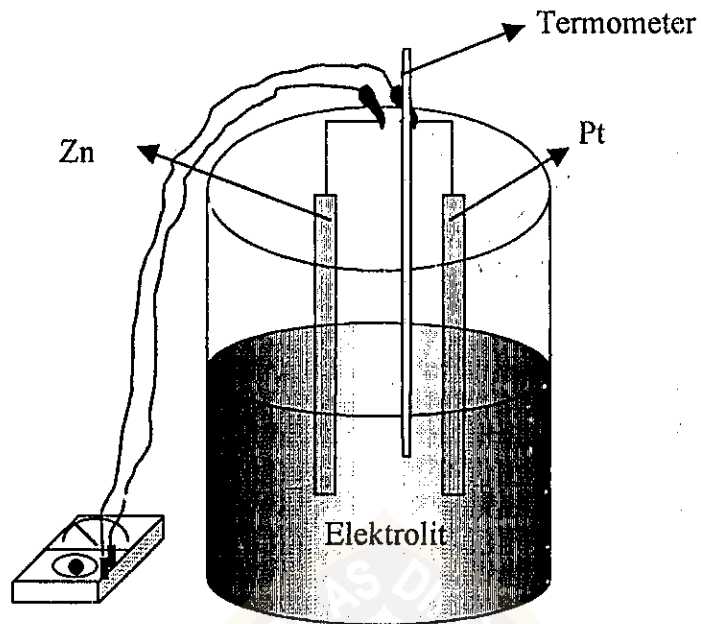


Lampiran 1. Skema Alat Metoda Elektrolisis Internal

Lampiran 2. Massa Tembaga Yang Mengendap

1. Variasi Waktu

No	Waktu elektolisis (menit)	Massa tembaga (mg)
1	30	7,73
2	60	8,58
3	90	15,08
4	120	16,03
5	270	18,69
6	300	19,24

1. Variasi Jarak elektrode

No	Jarak elektrode (cm)	Massa tembaga (mg)
1	1	13,53
2	2	10,58
3	2.5	9,13
4	3	10,08
5	3.5	8,43

2. Variasi Membran

Tanpa membran (mg)	Dengan membran (mg)
18,69	14,67

Lampiran 3. Hasil Pengukuran Arus

1. Variasi Waktu

No	Waktu	Arus (mA)
1	0	24
2	30	21.5
3	60	20
4	90	15
5	120	12
6	270	2.5
7	300	1

2. Variasi Jarak elektrode

No	Jarak (cm)	Arus (mA)	
		Awal	Akhir
1	1	50	15
2	2	30	21.5
3	2.5	17.5	15
4	3	16	15
5	3.5	12.5	11.5

3. Variasi Membran

Tanpa membran (mA)	Dengan membran (mA)
2,5	7

4. Aplikasi ke Limbah

Arus awal (mA)	Arus akhir (mA)
14,5	4

Lampiran 4. Hasil Pengamatan Potensial yang terjadi

1. Variasi Waktu

No	Waktu	Potensial (V)	
		Awal	Akhir
1	0	1.0	0.9
2	30	1.0	0.9
3	60	1.0	0.9
4	90	1.0	0.85
5	120	1.0	0.85
6	270	1.0	0.95
7	300	1.0	1.0

2. Variasi Jarak elektrode

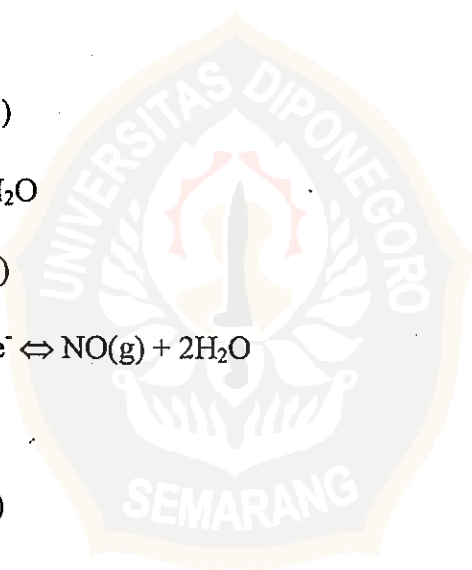
No	Jarak (cm)	Potensial (V)	
		Awal	Akhir
1	1	1.0	0.9
2	2	1.0	0.9
3	2.5	1.0	0.9
4	3	1.0	0.85
5	3.5	1.0	0.85

3. Variasi Membran

Tanpa membran		Dengan membran	
Awal (V)	Akhir (V)	Awal (V)	Akhir (V)
1,0	0,95	1,0	0,9

Lampiran 5. Tabel Potensial Reduksi Standar pada 25 °C

Setengah Reaksi	E^0 (V)
$F_2(g) + 2e^- \rightleftharpoons 2F^-$	+2.87
$PbO_2(s) + SO_4^{2-}(aq) + 4H^+ + 2e^- \rightleftharpoons PbSO_4(s) + H_2O$	+1.69
$2HOCl(aq) + 2H^+(aq) + 2e^- \rightleftharpoons Cl_2(g) + 2H_2O$	+1.63
$MnO_4^{4-}(aq) + 8H^+(aq) + 5e^- \rightleftharpoons Mn^{2+}(aq) + 4H_2O$	+1.51
$PbO_2(s) + 4H^+(aq) + 2e^- \rightleftharpoons Pb^{2+}(aq) + 2H_2O$	+1.46
$BrO_3^-(aq) + 6H^+(aq) + 6e^- \rightleftharpoons Br^-(aq) + 3H_2O$	+1.44
$Au^{3+}(aq) + 3e^- \rightleftharpoons Au(s)$	+1.42
$Cl_2(g) + 2e^- \rightleftharpoons Cl^-(aq)$	+1.36
$O_2(g) + 4H^+ + 4e^- \rightleftharpoons 2H_2O$	+1.23
$Br_2(aq) + 2e^- \rightleftharpoons 2Br^-(aq)$	+1.07
$NO_3^-(aq) + 4H^+(aq) + 3e^- \rightleftharpoons NO(g) + 2H_2O$	+0.96
$Ag^+(aq) + e^- \rightleftharpoons Ag(s)$	+0.80
$Fe^{3+}(aq) + e^- \rightleftharpoons Fe^{2+}(aq)$	+0.77
$I_2(s) + 2e^- \rightleftharpoons 2I^-(aq)$	+0.54
$NiO_2(aq) + 4H^+(aq) + 3e^- \rightleftharpoons Ni(OH)_2(s) + 2OH^-(aq)$	+0.49
$Cu^{2+} + 2e^- \rightleftharpoons Cu(s)$	+0.34
$SO_4^{2-} + 4H^+(aq) + 2e^- \rightleftharpoons H_2SO_3(aq) + H_2O$	+0.17
$2H^+(aq) + 2e^- \rightleftharpoons H_2(g)$	0.00



Setengah Reaksi	E^0 (V)
$\text{Sn}^{2+}(\text{aq}) \Leftrightarrow \text{Ni}$	-0.14
$\text{Ni}^{2+}(\text{aq}) + 2\text{e}^- \Leftrightarrow \text{Ni}(\text{s})$	-0.25
$\text{CO}^{2+}(\text{aq}) + 2\text{e}^- \Leftrightarrow \text{CO}(\text{s})$	-0.28
$\text{PbSO}_4(\text{s}) + 2\text{e}^- \Leftrightarrow \text{Pb}(\text{s}) + \text{SO}_4^{2-}(\text{aq})$	-0.36
$\text{Cd}^{2+}(\text{aq}) + 2\text{e}^- \Leftrightarrow \text{Cd}(\text{s})$	-0.40
$\text{Fe}^{2+}(\text{aq}) + 2\text{e}^- \Leftrightarrow \text{Fe}(\text{s})$	-0.44
$\text{Cr}^{3+}(\text{aq}) + 3\text{e}^- \Leftrightarrow \text{Cr}(\text{s})$	-0.74
$\text{Zn}^{2+}(\text{aq}) + 2\text{e}^- \Leftrightarrow \text{Zn}(\text{s})$	-0.76
$\text{H}_2\text{O}(\text{aq}) + 2\text{e}^- \Leftrightarrow \text{H}_2(\text{g}) + 2\text{OH}^-$	-1.66
$\text{Mg}^{2+} + 2\text{e}^- \Leftrightarrow \text{Mg}(\text{s})$	-2.37
$\text{Na}^+(\text{aq}) + \text{e}^- \Leftrightarrow \text{Na}(\text{s})$	-2.71
$\text{Ca}^{2+}(\text{aq}) + 2\text{e}^- \Leftrightarrow \text{Ca}(\text{s})$	-2.76
$\text{K}^+(\text{aq}) + \text{e}^- \Leftrightarrow \text{K}(\text{s})$	-2.92
$\text{Li}^+(\text{aq}) + 2\text{e}^- \Leftrightarrow \text{Li}(\text{s})$	-3.05

