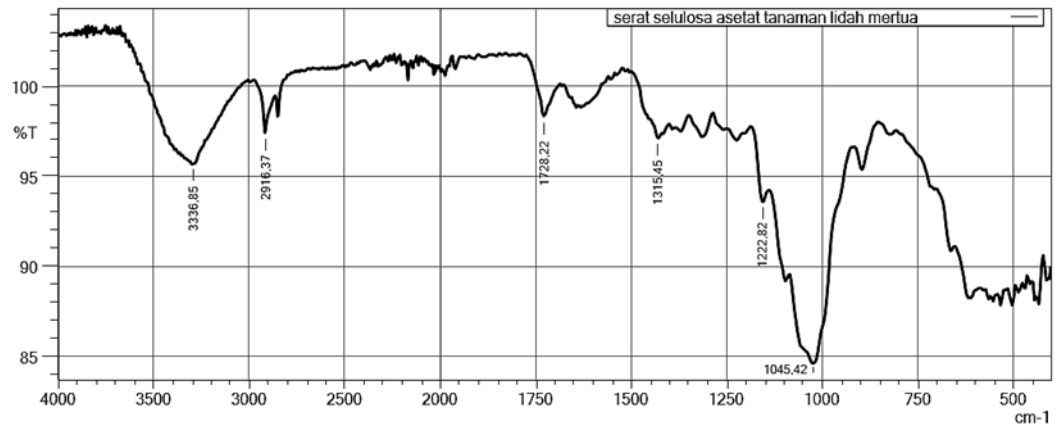
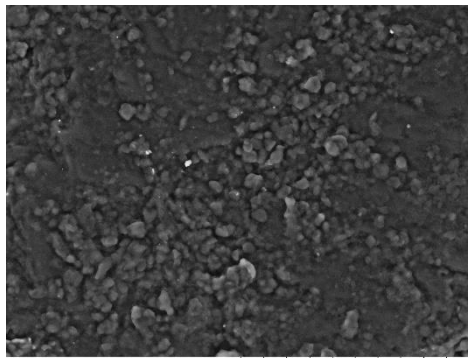


## LAMPIRAN

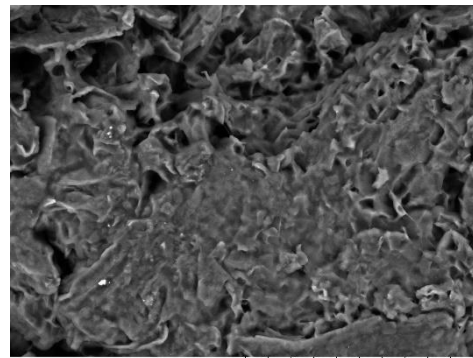
### Lampiran 1. Hasil Spekrtrum FTIR Selulosa Asetat Lidah Mertua



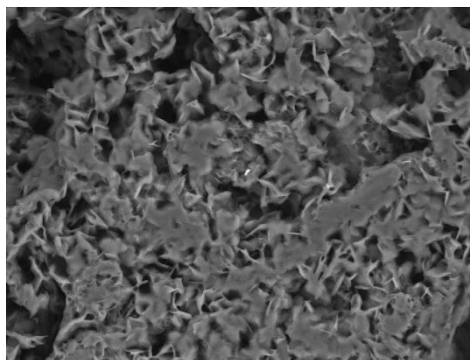
### Lampiran 2. Hasil Pengujian SEM Membran Selulosa Asetat



Membran SA/PEG 2 mL

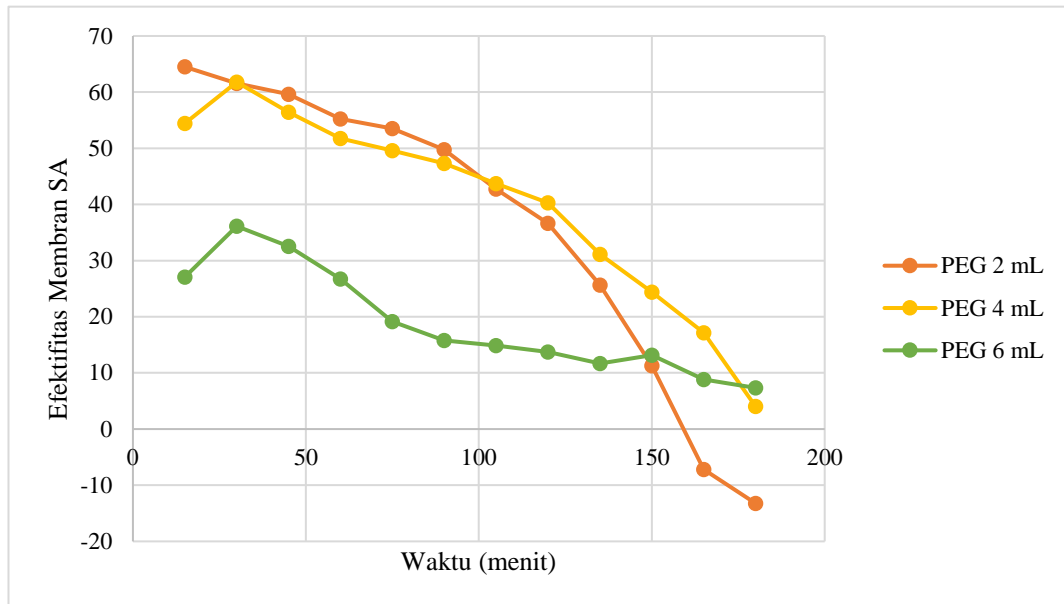


Membran SA/PEG 4 mL



Membran SA/PEG 6 mL

**Lampiran 3.** Hasil Analisis Data Waktu Penggunaan Membran SA dalam Mereduksi CO pada Asap Rokok



Gambar Grafik Waktu Penggunaan Membran SA dengan Variasi Penambahan PEG dalam Mereduksi CO pada asap rokok

**Perhitungan Efektivitas**

$$\% \text{ Efektivitas} = \frac{C_1 - C_2}{C_1} \times 100$$

Keterangan :

C<sub>1</sub> : Kadar emisi gas awal (*input*)

C<sub>2</sub> : Kadar gas setelah melalui filter (*output*)

**a) Efektivitas Membran SA/PEG 2 mL dalam mereduksi CO**

1. Menit 15

$$\begin{aligned} \% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{66,2 - 23,5}{66,2} \times 100 \\ &= 64,50\% \end{aligned}$$

2. Menit 30

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{63,7-24,5}{63,7} \times 100 \\ &= 61,54\%\end{aligned}$$

3. Menit 45

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{65,6-26,5}{65,6} \times 100 \\ &= 59,60\%\end{aligned}$$

4. Menit 60

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{65,2-29,2}{65,2} \times 100 \\ &= 55,21\%\end{aligned}$$

5. Menit 75

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{63,5-29,5}{63,5} \times 100 \\ &= 53,54\%\end{aligned}$$

6. Menit 90

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{61,3-30,8}{61,3} \times 100 \\ &= 49,76\%\end{aligned}$$

7. Menit 105

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{58,5-33,5}{58,5} \times 100 \\ &= 42,74\%\end{aligned}$$

8. Menit 120

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{60,8-38,5}{60,8} \times 100 \\ &= 36,68\%\end{aligned}$$

9. Menit 135

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{58,5-43,5}{58,5} \times 100 \\ &= 25,64\%\end{aligned}$$

10. Menit 150

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{55,8-49,5}{55,8} \times 100 \\ &= 11,29\%\end{aligned}$$

11. Menit 165

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{51,5-55,2}{51,5} \times 100 \\ &= -7,18\%\end{aligned}$$

12. Menit 180

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{49,9-56,5}{49,9} \times 100 \\ &= -13,23\%\end{aligned}$$

**b) Efektivitas Membran SA/PEG 4 mL dalam mereduksi CO**

1. Menit 15

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{66,9 - 30,5}{66,9} \times 100 \\ &= 54,41\%\end{aligned}$$

2. Menit 30

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{61,5 - 23,5}{61,5} \times 100 \\ &= 61,79\%\end{aligned}$$

3. Menit 45

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{69,1 - 30,1}{69,1} \times 100 \\ &= 56,44\%\end{aligned}$$

4. Menit 60

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{63,2 - 30,5}{63,2} \times 100 \\ &= 51,74\%\end{aligned}$$

5. Menit 75

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{62,5 - 31,5}{62,5} \times 100 \\ &= 49,60\%\end{aligned}$$

6. Menit 90

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{61,3 - 32,3}{61,3} \times 100 \\ &= 47,31\%\end{aligned}$$

7. Menit 105

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{59,5-33,5}{59,5} \times 100 \\ &= 43,70\%\end{aligned}$$

8. Menit 120

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{62,3-37,2}{62,3} \times 100 \\ &= 40,29\%\end{aligned}$$

9. Menit 135

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{59,8-41,2}{59,8} \times 100 \\ &= 31,10\%\end{aligned}$$

10. Menit 150

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{61,5-46,5}{61,5} \times 100 \\ &= 24,39\%\end{aligned}$$

11. Menit 165

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{58,8-48,7}{58,8} \times 100 \\ &= 17,18\%\end{aligned}$$

12. Menit 180

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{54,5-52,3}{54,5} \times 100 \\ &= 4,04\%\end{aligned}$$

**c) Efektivitas Membran SA/PEG 6 mL dalam mereduksi CO**

1. Menit 15

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{66,5 - 48,5}{66,5} \times 100 \\ &= 27,07\%\end{aligned}$$

2. Menit 30

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{58,7 - 37,5}{58,7} \times 100 \\ &= 36,12\%\end{aligned}$$

3. Menit 45

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{65,5 - 44,2}{65,5} \times 100 \\ &= 32,52\%\end{aligned}$$

4. Menit 60

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{62,5 - 45,8}{62,5} \times 100 \\ &= 26,72\%\end{aligned}$$

5. Menit 75

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{57,5 - 46,5}{57,5} \times 100 \\ &= 19,13\%\end{aligned}$$

6. Menit 90

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C_1 - C_2}{C_1} \times 100 \\ &= \frac{60,8 - 51,2}{60,8} \times 100 \\ &= 15,79\%\end{aligned}$$

7. Menit 105

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{62,5-53,2}{62,5} \times 100 \\ &= 14,88\%\end{aligned}$$

8. Menit 120

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{65,5-56,5}{65,5} \times 100 \\ &= 13,74\%\end{aligned}$$

9. Menit 135

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{62,5-55,2}{62,5} \times 100 \\ &= 11,68\%\end{aligned}$$

10. Menit 150

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{60,8-52,8}{60,8} \times 100 \\ &= 13,16\%\end{aligned}$$

11. Menit 165

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{56,8-51,8}{56,8} \times 100 \\ &= 8,80\%\end{aligned}$$

12. Menit 180

$$\begin{aligned}\% \text{ Efektivitas} &= \frac{C1-C2}{C1} \times 100 \\ &= \frac{54,5-50,5}{54,5} \times 100 \\ &= 7,34\%\end{aligned}$$



#### Lampiran 4. Proses Sintesis Selulosa Asetat



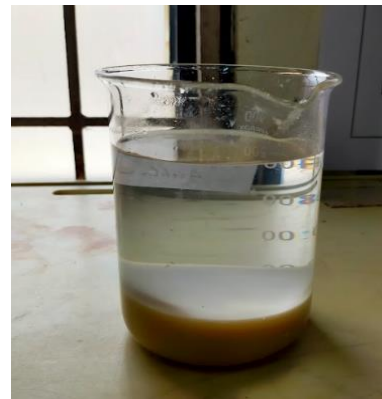
Serbuk selulosa



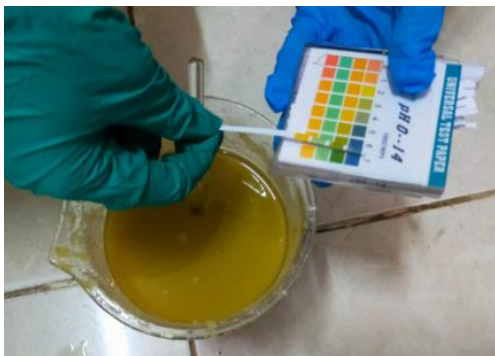
Proses *swelling-up* dan asetilasi



Hasil endapan proses sintesis



Proses hidrolisis



Pengecekan pH larutan



Penyaringan sampel



Hasil pengovenan selulosa asetat



Penghalusan selulosa asetat

**Lampiran 5. Proses Pembuatan Membran**



Serbuk selulosa asetat



Pembuatan membran SA



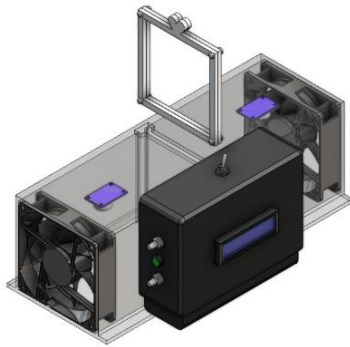
Pencetakan membran SA



Hasil membran SA

## Lampiran 6. Pengaplikasian Membran SA pada alat pendeteksi CO

(Ningrum, 2022)



Desain alat pereduksi CO



Tempat membran pada alat pereduksi CO



Pengujian waktu penggunaan membran SA



Tampilan hasil dari alat pereduksi CO

## BIODATA PENULIS



Nama Lengkap : I'zaaz Ayundha Gudmanto  
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Alamat : Jalan Sadewa No.18 RT 03/RW 02, Kebonmanis, Cilacap  
Utara, Cilacap, Jawa Tengah  
Kewarganegaraan : Indonesia  
Agama : Islam  
E-mail : izaazayundha14@gmail.com  
Telepon/Hp : 082135843411  
Hobi : Memasak dan mendengarkan lagu

### Riwayat Pendidikan

Jenjang	Nama Instansi	Jurusan	Lama Tahun
SD	SD Negeri Kebonmanis 3 Cilacap	-	2006 – 2012
SMP	SMP Negeri 5 Cilacap	-	2012 – 2015
SMA	SMA Negeri 2 Cilacap	MIPA	2015 – 2018
Perguruan Tinggi	Politeknik Negeri Cilacap	DIV Teknik Pengendalian Pencemaran Lingkungan	2018 - 2022