

LAMPIRAN

Lampiran 1. Prosedur Kerja

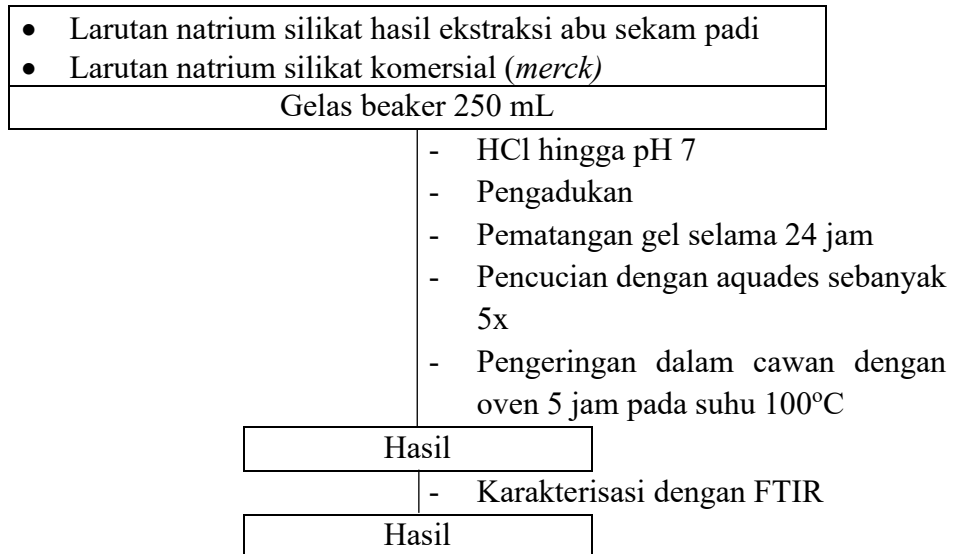
Preparasi Sampel

Sekam padi	
Gelas beaker 500 mL	
	<ul style="list-style-type: none">- Pencucian dengan air mengalir- Penjemuran di bawah terik matahari- Pengeringan dalam cawan dengan oven 90 menit pada suhu 100°C- Kalsinasi selama 1 jam pada suhu 700°C- <i>Leaching</i> dengan 100 mL HCl 1 M- Pengadukan dengan <i>stirrer</i> 1 jam pada kecepatan 200 rpm suhu 200°C- Penyaringan- Pencucian dengan aquades- Pengeringan dalam oven 4 jam pada suhu 100°C
Hasil	

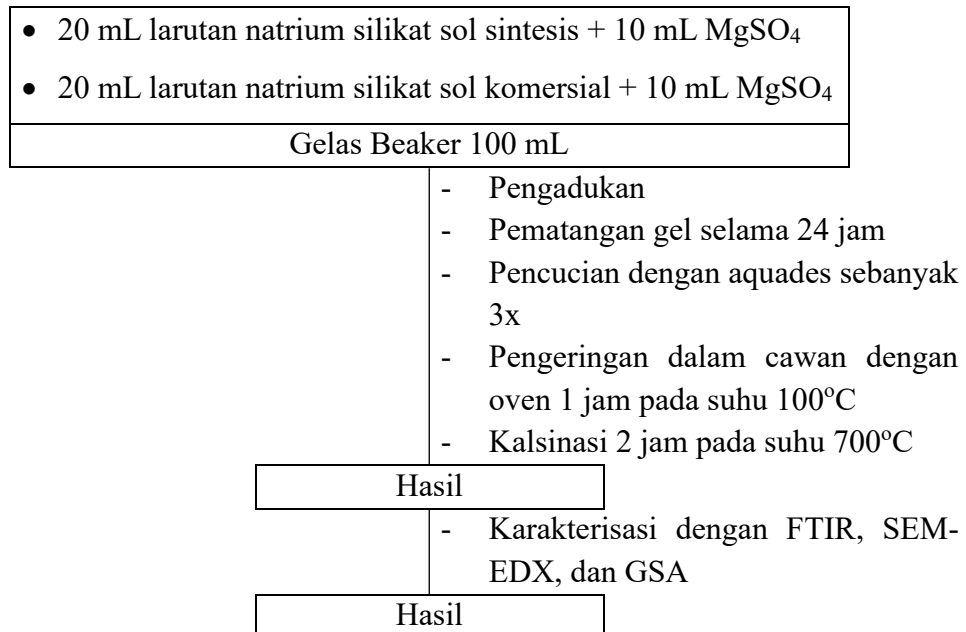
Ekstraksi Abu Sekam Padi

Abu sekam adi	
Gelas beaker 250 mL	
	<ul style="list-style-type: none">- Ekstraksi dengan 100 mL NaOH 1 M- Pengadukan dengan <i>stirrer</i> 90 menit kecepatan 200 rpm pada suhu 90°C- Penyaringan
Hasil	

Sintesis Silika



Pembuatan Oksida SiO₂-MgO & Karakterisasi



Uji Kemampuan Adsorpsi

- Pembuatan Larutan Standar

1,59 g $\text{Pb}(\text{NO}_3)_2$	
labu ukur 1000 mL	
	- Penambahan aquades hingga tanda batas
	- Penggojogan
Hasil	

- Pengenceran Larutan Induk $\text{Pb}(\text{II})$

1; 2,5; 5; 10; dan 15 mL larutan $\text{Pb}(\text{II})$	
labu ukur 100 mL	
	- Penambahan aquades hingga tanda batas
	- Penggojogan
Hasil	

- Uji Kemampuan Adsorpsi $\text{Pb}(\text{II})$

15 mL larutan $\text{Pb}(\text{II})$ 10; 25; 50; 100; dan 150 mg/L	
Gelas beaker 100 mL	
	- Penambahan 0,05 g adsorben SiO_2 sintesis; SiO_2 komersial; $\text{SiO}_2\text{-MgO}$ sol sintesis; dan $\text{SiO}_2\text{-MgO}$ sol komersial
	- Pengontakan dengan <i>shaker</i> 100 rpm selama 30 menit
	- Penyaringan
	- Penambahan 1 mL asam nitrat dalam larutan sampel
	- Uji kemampuan adsorpsi dengan AAS
Hasil	

Lampiran 2. Pehitungan

- Pengenceran NaOH 98,5% menjadi 1 M

$$M = \frac{m \cdot 1000}{Mr \cdot V}$$

$$1 = \frac{g \cdot 1000}{40 \cdot 100}$$

$$g = \frac{1 \cdot 40 \cdot 100}{1000} = 4 \text{ g (NaOH 100\%)}$$

Untuk NaOH 98,5%, maka:

$$\frac{98,5\%}{100\%} = \frac{g}{4}$$

$$g = \frac{98,5\% \cdot 4}{100\%} = 3,94 \text{ g}$$

- Pengenceran HCl 32% menjadi 1 M

$$M = \frac{\rho \cdot \% \cdot 10}{Mr} = \frac{1,18 \cdot 32 \cdot 10}{36,5} = 10,34 \text{ M}$$

$$M_1 V_1 = M_2 V_2$$

$$(10,34)(V_1) = (1)(100)$$

$$v_1 = \frac{(1)(100)}{10,34} = 9,67 \text{ mL}$$

- Pembuatan Larutan $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ 3 M

$$M = \frac{m \cdot 1000}{Mr \cdot V}$$

$$3 \text{ M} = \frac{g \cdot 1000}{120 \cdot 70}$$

$$g = \frac{3 \cdot 120 \cdot 70}{1000} = 25,2 \text{ g}$$

- Pembuatan Larutan Induk Pb(II) 1000 ppm dari $\text{Pb}(\text{NO}_3)_2$

$$\frac{Mr \text{ Pb}(\text{No}_3)_2}{Ar \text{ Pb}} \times 1000 \text{ mg} = \frac{331,29}{207,19} \times 1000 \text{ mg} = 1598,97 \text{ mg}$$
$$= 1,59897 \text{ g}$$

- Pengenceran Larutan Induk Pb(II) 1000 ppm menjadi 100 ppm

Diketahui $x = 10, 25, 50, 100$, dan 150 ppm

$$M_1 V_1 = M_2 V_2$$

$$(1000)(V_1) = (x)(100)$$

$$v_1 = \frac{(x)(100)}{1000}$$

- Pengenceran 10 ppm

$$v_1 = \frac{(10)(100)}{1000} = 1 \text{ mL}$$

- Pengenceran 25 ppm

$$v_1 = \frac{(25)(100)}{1000} = 2,5 \text{ mL}$$

- Pengenceran 50 ppm

$$v_1 = \frac{(50)(100)}{1000} = 5 \text{ mL}$$

- Pengenceran 100 ppm

$$v_1 = \frac{(100)(100)}{1000} = 10 \text{ mL}$$

- Pengenceran 150 ppm

$$v_1 = \frac{(150)(100)}{1000} = 15 \text{ mL}$$

- Kapasitas Adsorpsi (q_e) & Efisiensi Adsorpsi (%E)

Kapasitas adsorpsi:

$$q_e = \frac{(C_o - C_e)v}{m}$$

Efisiensi adsorpsi:

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\%$$

- ❖ Adsorben SiO₂ sol sintesis

C _o (mg/L)	C _e (mg/L)	V (mL)	m (mg)	q _e (mg/g)	%E
10	0,0140	15	50	2,9995	99,98
25	0,0780			7,4766	99,68
50	0,1206			14,9638	99,75
100	0,0648			29,9805	99,93
150	0,0317			44,9904	99,97

- Konsentrasi 10 ppm

Diketahui: C_o = 10 mg/L V = 15 mL

C_e = 0,0140 mg/L m = 50 mg

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(10 - 0,0140)15}{50} = 2,9995 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(10 - 0,0140)}{10} \times 100\% = 99,98\%$$

➤ Konsentrasi 25 ppm

Diketahui: $C_o = 25 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0780 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(25 - 0,0780)15}{50} = 7,4755 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(25 - 0,0780)}{25} \times 100\% = 99,68\%$$

➤ Konsentrasi 50 ppm

Diketahui: $C_o = 50 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,1206 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(50 - 0,1206)15}{50} = 14,9638 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(50 - 0,1206)}{50} \times 100\% = 99,75\%$$

➤ Konsentrasi 100 ppm

Diketahui: $C_o = 100 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0648 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(100 - 0,0648)15}{50} = 22,9805 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(100 - 0,0648)}{100} \times 100\% = 99,93\%$$

➤ Konsentrasi 150 ppm

Diketahui: $C_o = 150 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0317 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(150 - 0,0317)15}{50} = 44,9904 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(150 - 0,0317)}{150} \times 100\% = 99,97\%$$

❖ Adsorben SiO₂ sol komersial

C _o (mg/L)	C _e (mg/L)	V (mL)	m (mg)	q _e (mg/g)	%E
10	0,0134	15	50	2,9959	99,86
25	0,0324			7,4902	99,87
50	0,0232			14,9930	99,95
100	0,0451			29,9864	99,95
150	0,2957			44,9112	99,80

➤ Konsentrasi 10 ppm

Diketahui: C_o = 10 mg/L V = 15 mL

C_e = 0,0134 mg/L m = 50 mg

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(10 - 0,0134)15}{50} = 2,9959 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(10 - 0,0134)}{10} \times 100\% = 99,86\%$$

➤ Konsentrasi 25 ppm

Diketahui: C_o = 25 mg/L V = 15 mL

C_e = 0,0324 mg/L m = 50 mg

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(25 - 0,0324)15}{50} = 7,4902 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(25 - 0,0324)}{25} \times 100\% = 99,87\%$$

➤ Konsentrasi 50 ppm

Diketahui: C_o = 50 mg/L V = 15 mL

C_e = 0,0232 mg/L m = 50 mg

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(50 - 0,0232)15}{50} = 14,9930 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(50 - 0,0232)}{50} \times 100\% = 99,95\%$$

➤ Konsentrasi 100 ppm

Diketahui: C_o = 100 mg/L V = 15 mL

C_e = 0,0451 mg/L m = 50 mg

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(100 - 0,0451)15}{50} = 29,9864 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(100 - 0,0451)}{100} \times 100\% = 99,95\%$$

➤ Konsentrasi 150 ppm

Diketahui: $C_o = 150 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,2957 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(150 - 0,2957)15}{50} = 44,9112 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(150 - 0,02957)}{150} \times 100\% = 99,80\%$$

❖ Adsorben $\text{SiO}_2\text{-MgO}$ sol sintesis

$C_o \text{ (mg/L)}$	$C_e \text{ (mg/L)}$	$V \text{ (mL)}$	$m \text{ (mg)}$	$q_e \text{ (mg/g)}$	$\%E$
10	0			3	100
25	0,0297			7,4910	99,88
50	0,0231	15	50	14,9930	99,95
100	0,0274			29,9917	99,97
150	0,0376			44,9887	99,97

➤ Konsentrasi 10 ppm

Diketahui: $C_o = 10 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(10 - 0)15}{50} = 3 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(10 - 0)}{10} \times 100\% = 100\%$$

➤ Konsentrasi 25 ppm

Diketahui: $C_o = 25 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0297 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(25 - 0,0297)15}{50} = 7,4910 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(25 - 0,0297)}{25} \times 100\% = 99,88\%$$

➤ Konsentrasi 50 ppm

Diketahui: $C_o = 50 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0231 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(50 - 0,0231)15}{50} = 14,9930 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(50 - 0,0231)}{50} \times 100\% = 99,95\%$$

➤ Konsentrasi 100 ppm

Diketahui: $C_o = 100 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0274 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(100 - 0,0274)15}{50} = 29,9917 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(100 - 0,0274)}{100} \times 100\% = 99,97\%$$

➤ Konsentrasi 150 ppm

Diketahui: $C_o = 150 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0376 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(150 - 0,0376)15}{50} = 29,9917 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(150 - 0,0376)}{150} \times 100\% = 99,97\%$$

❖ Adsorben $\text{SiO}_2\text{-MgO}$ sol komersial

$C_o \text{ (mg/L)}$	$C_e \text{ (mg/L)}$	$V \text{ (mL)}$	$m \text{ (mg)}$	$q_e \text{ (mg/g)}$	$\%E$
10	0,0049	15	50	2,9985	99,95
25	0,0197			7,4940	99,92
50	0,0117			14,9964	99,97
100	0,1665			29,9500	99,83
150	0,3967			44,8809	99,73

➤ Konsentrasi 10 ppm

Diketahui: $C_o = 10 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0049 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(10 - 0,0049)15}{50} = 2,9985 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(10 - 0,0049)}{10} \times 100\% = 99,095\%$$

➤ Konsentrasi 25 ppm

Diketahui: $C_o = 25 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0197 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(25 - 0,0197)15}{50} = 7,4940 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(25 - 0,0197)}{25} \times 100\% = 99,92\%$$

➤ Konsentrasi 50 ppm

Diketahui: $C_o = 50 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,0117 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(50 - 0,0117)15}{50} = 14,9964 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(50 - 0,0117)}{50} \times 100\% = 99,97\%$$

➤ Konsentrasi 100 ppm

Diketahui: $C_o = 100 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,1665 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(100 - 0,1665)15}{50} = 29,9500 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(100 - 0,1665)}{100} \times 100\% = 99,83\%$$

➤ Konsentrasi 150 ppm

Diketahui: $C_o = 150 \text{ mg/L}$ $V = 15 \text{ mL}$

$C_e = 0,3967 \text{ mg/L}$ $m = 50 \text{ mg}$

$$q_e = \frac{(C_o - C_e)v}{m} = \frac{(150 - 0,3967)15}{50} = 44,8809 \text{ mg/g}$$

$$\%E = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(150 - 0,3967)}{150} \times 100\% = 99,73\%$$

• Isoterm Adsorpsi

❖ Adsorben SiO_2 sol sintesis

C_o (mg/L)	C_e (mg/L)	q_e (mg/g)	Isoterm Langmuir		Isoterm Freundlich	
			$1/C_e$	$1/q_e$	$\text{Log } C_e$	$\text{Log } q_e$
10	0,0140	2,9995	714,2857	0,33338	-2,8538	0,4770
25	0,0780	7,4766	12,8205	0,1337	-1,1079	0,8737
50	0,1206	14,9638	8,2918	0,0668	-0,9186	1,1750
100	0,0648	29,9805	15,4320	0,0333	-1,1884	1,4768
150	0,0317	44,9904	31,5457	0,0222	-1,4989	1,6531

❖ Adsorben SiO₂ sol komersial

C₀ (mg/L)	C_e (mg/L)	q_e (mg/g)	Isoterm Langmuir		Isoterm Freundlich	
			1/C_e	1/q_e	Log C_e	Log q_e
10	0,0049	2,9985	74,6268	0,3337	-1,8728	0,4765
25	0,0197	7,4940	30,8641	0,1335	-1,4894	0,8744
50	0,0117	14,9964	43,1034	0,0666	-1,6345	1,1758
100	0,1665	29,9500	22,1729	0,0333	-1,3458	1,4769
150	0,3967	44,8809	3,3818	0,0222	-0,5291	1,6523

❖ Adsorben SiO₂-MgO sol sintesis

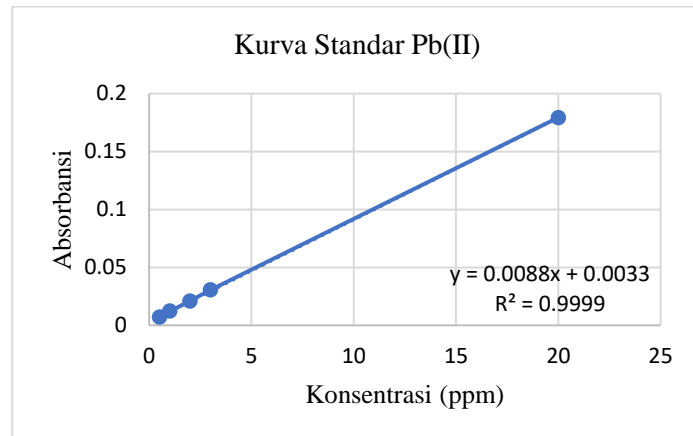
C₀ (mg/L)	C_e (mg/L)	q_e (mg/g)	Isoterm Langmuir		Isoterm Freundlich	
			1/C_e	1/q_e	Log C_e	Log q_e
10	0	3	#DIV/0!	0,3333	#NUM!	0,4771
25	0,0297	7,4910	33,6700	0,1334	-1,5272	0,8745
50	0,0231	14,9930	43,2900	0,0666	-1,6363	1,1758
100	0,0274	29,9917	36,4963	0,0333	-1,5622	1,4770
150	0,0376	44,9887	26,5957	0,0222	-1,4248	1,6531

❖ Adsorben SiO₂-MgO sol komersial

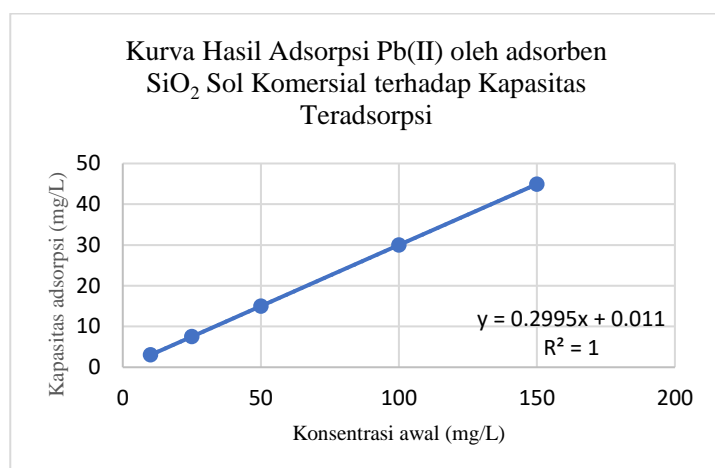
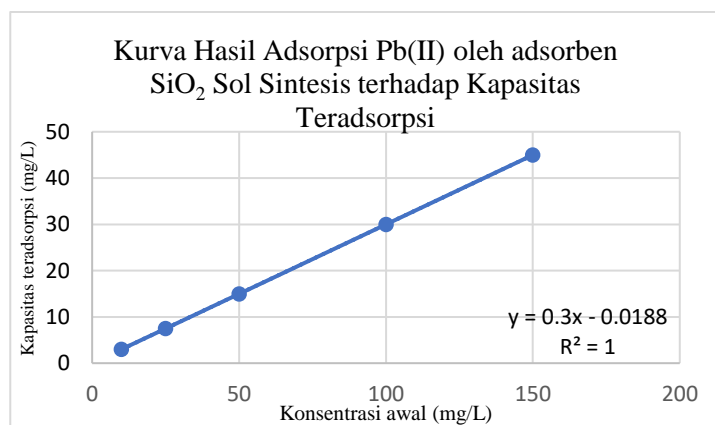
C₀ (mg/L)	C_e (mg/L)	q_e (mg/g)	Isoterm Langmuir		Isoterm Freundlich	
			1/C_e	1/q_e	Log C_e	Log q_e
10	0,0049	2,9985	204,0816	0,3334	-2,3098	0,4769
25	0,0197	7,4940	50,7614	0,1334	-1,7055	0,8747
50	0,0117	14,9964	85,4700	0,0666	-1,9318	1,1759
100	0,1665	29,9500	6,0060	0,0333	-0,7785	1,4763
150	0,3967	44,8809	2,5207	0,0222	-0,4015	1,6520

Lampiran 3. Hasil Pengukuran

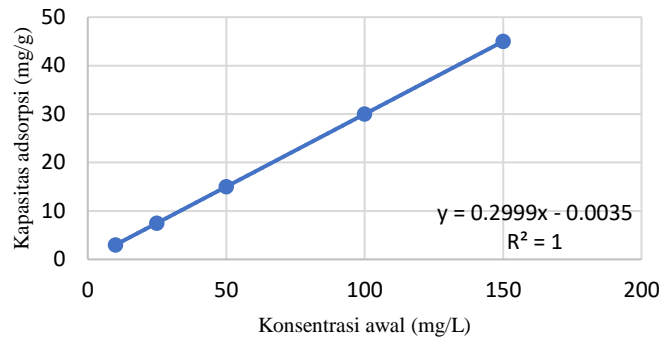
- Kurva Standar



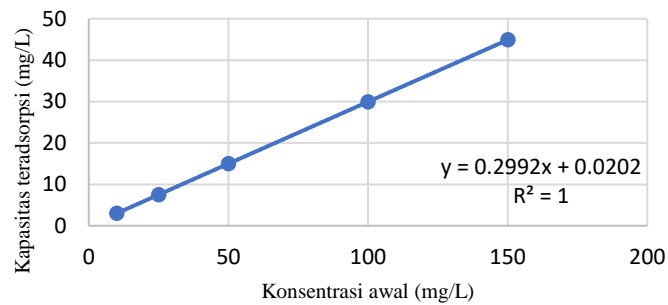
- Kapasitas Adsorpsi



Kurva Hasil Adsorpsi Pb(II) oleh adsorben SiO₂-MgO Sol Sintesis terhadap Kapasitas Teradsorpsi

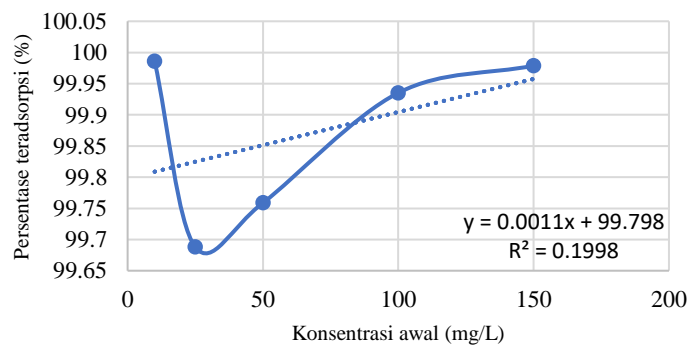


Kurva Hasil Adsorpsi Pb(II) oleh adsorben SiO₂-MgO Sol Komersial terhadap Kapasitas Teradsorpsi

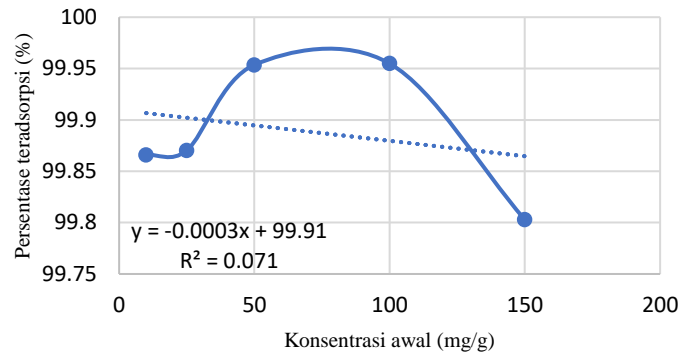


- Efisiensi Adsorpsi

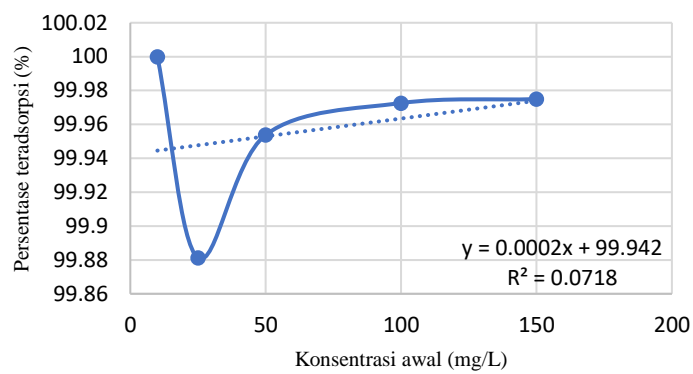
Kurva Hasil Adsorpsi Pb(II) oleh SiO₂ Sol Sintesis terhadap Persentase Teradsorpsi



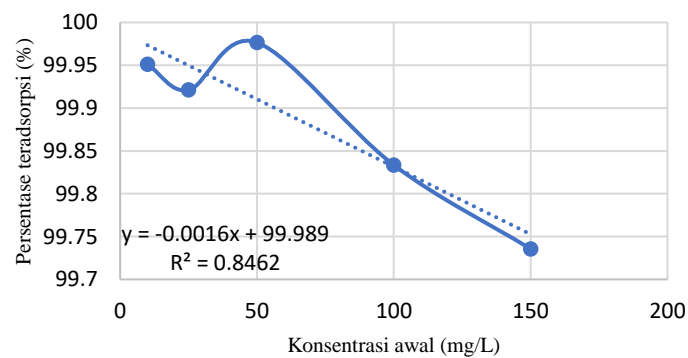
Kurva Hasil Adsorpsi Pb(II) oleh SiO₂ Sol Komersial terhadap Persentase Teradsorpsi



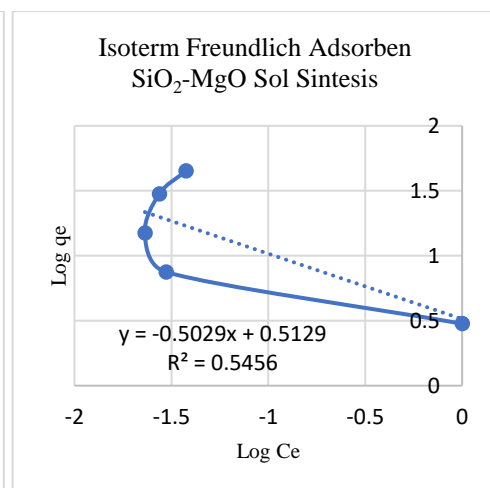
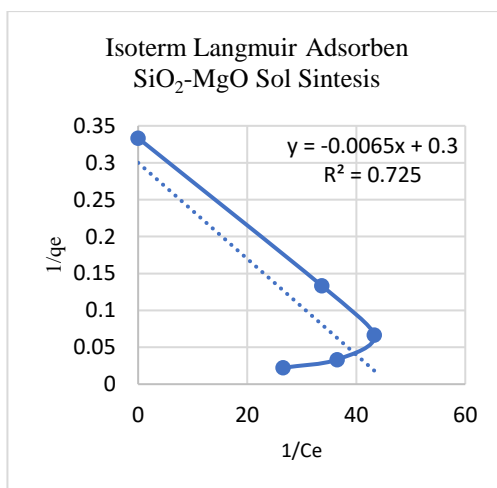
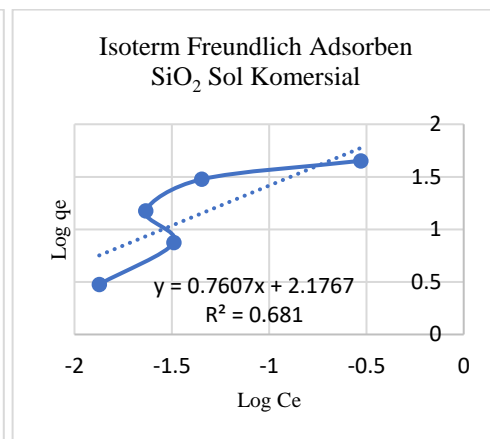
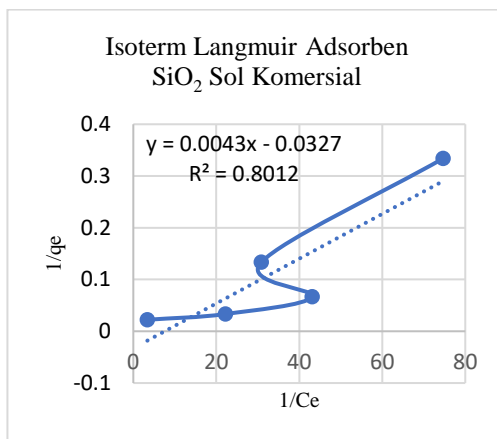
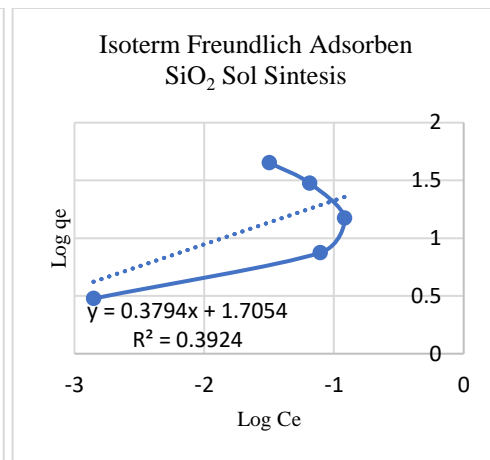
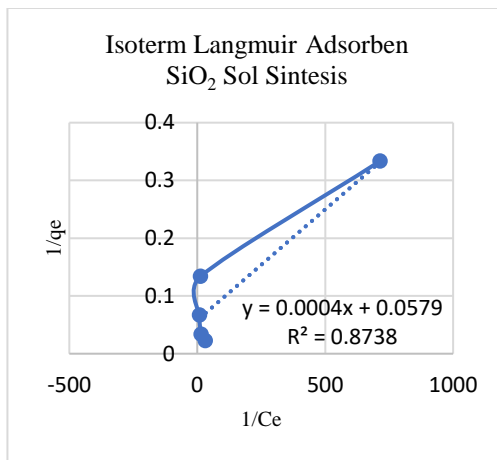
Kurva Hasil Adsorpsi Pb(II) oleh SiO₂-MgO Sol Sintesis terhadap Persentase Teradsorpsi

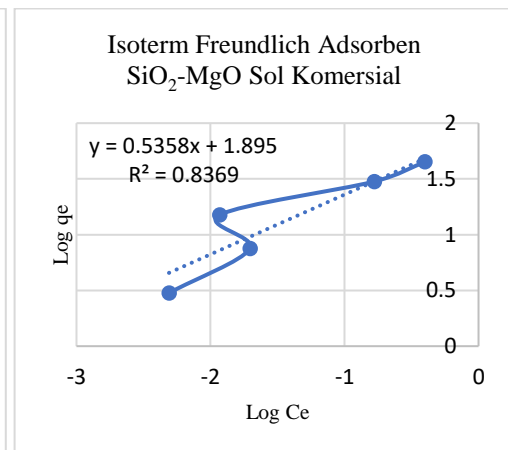
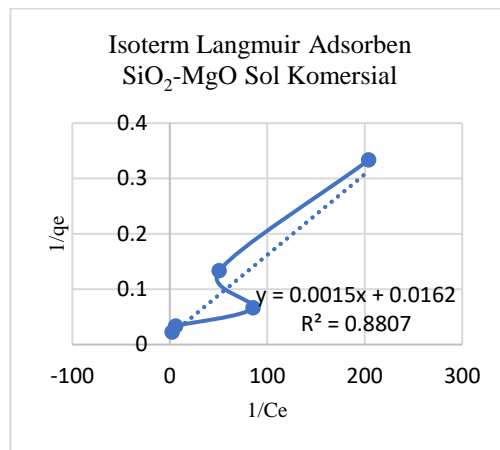


Kurva Hasil Adsorpsi Pb(II) oleh SiO₂-MgO Sol Komersial terhadap Persentase Teradsorpsi



- Isoterm Adsorpsi





Lampiran 4. Dokumentasi

Preparasi Sampel



Ekstraksi Abu Sekam Padi



Sintesis Silika dari Abu Sekam Padi



Sintesis $\text{SiO}_2\text{-MgO}$ & Karakterisasi



Uji Kemampuan Adsorpsi



Lampiran 5. Data Penelitian

Hasil Analisis FTIR

SiO₂ Sol Sintesis



Lab. Terpadu UNDIP

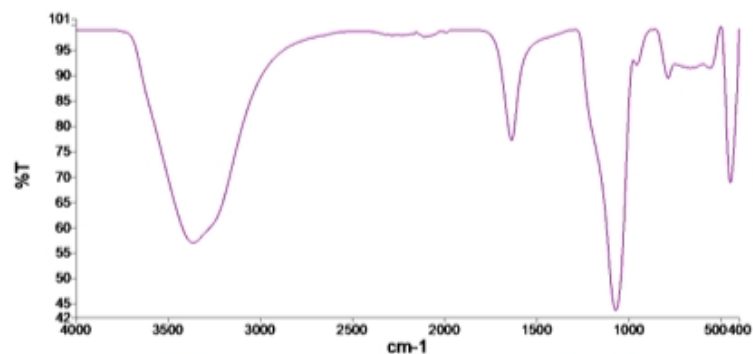
PerkinElmer Spectrum IR 10.6.1

December 1, 2023 3:41

Sample Details

Filename	E:\Report Hasil analisis FTIR\2023\Desember 2023\SP23265014011\ (FTIR Silika Hana FSM)_1_1.sp
Creation Date	12/1/2023 1:17:56 PM
Analyst	Administrator
X-Axis Units	cm-1
X-Axis start value	4000
X-Axis end value	400
Data interval	-1
Number of points	3601
Y-Axis Units	%T
Description	Sample (FTIR Silika Hana FSM) By Administrator Date Friday, December 01 2023

Spectrum



Name (FTIR Silika Hana FSM)_1_1 Description Sample (FTIR Silika Hana FSM) By Administrator Date Friday, December 01 2023

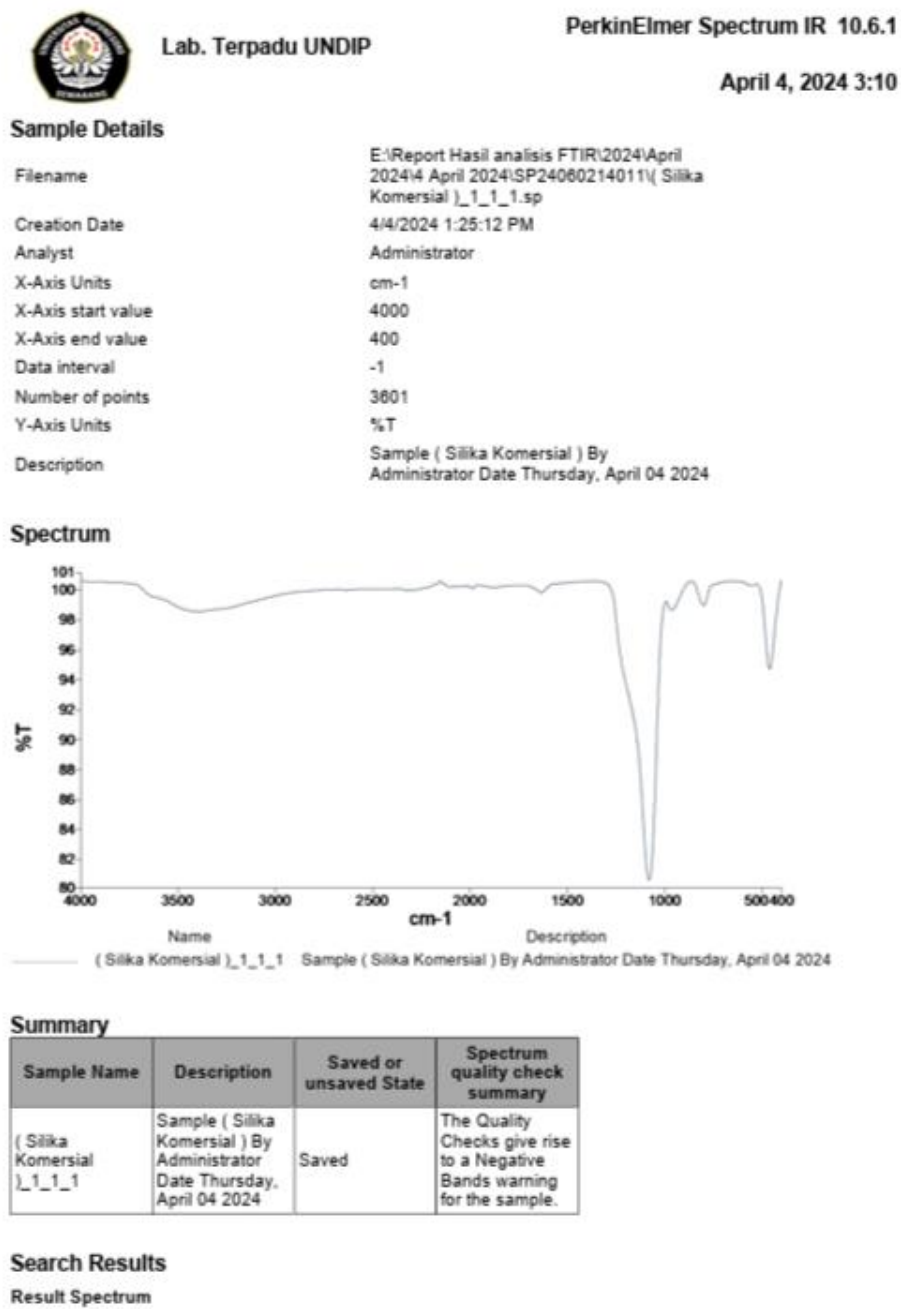
Summary

Sample Name	Description	Saved or unsaved State	Spectrum quality check summary
(FTIR Silika Hana FSM)_1_1	Sample (FTIR Silika Hana FSM) By Administrator Date Friday, December 01 2023	Saved	The Quality Checks do not report any warnings for the sample.

Search Results

Result Spectrum

- SiO₂ Sol Komersial



- SiO₂-MgO Sol Silika Sintesis



Lab. Terpadu UNDIP

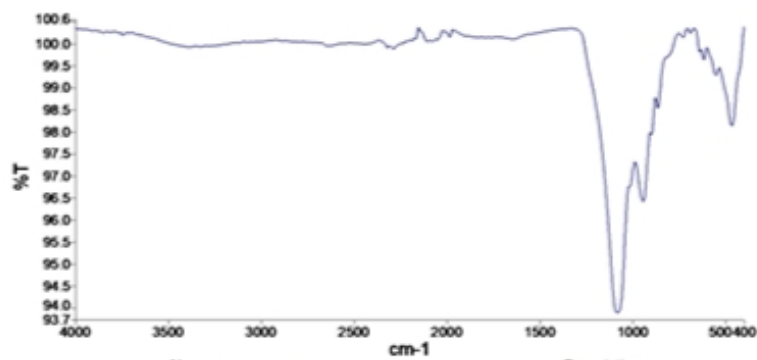
PerkinElmer Spectrum IR 10.6.1

December 7, 2023 20:24

Sample Details

Filename E:\Report Hasil analisis
FTIR\2023\Desember 2023\8 Desember
2023\SP23267614011\Komposit Hana, A1
_1_1_1.sp
Creation Date 12/8/2023 7:06:28 AM
Analyst Administrator
X-Axis Units cm-1
X-Axis start value 4000
X-Axis end value 400
Data interval -1
Number of points 3601
Y-Axis Units %T
Description Sample (Komposit Hana, A1) By
Administrator Date Wednesday, December
06 2023

Spectrum



Name (Komposit Hana, A1)_1_1_1 Description Sample (Komposit Hana, A1) By Administrator Date Wednesday, Decem

Summary

Sample Name	Description	Saved or unsaved State	Spectrum quality check summary
(Komposit Hana, A1)_1_1_1	Sample (Komposit Hana, A1) By Administrator Date Wednesday, December 06 2023	Saved	The Quality Checks give rise to a Weak Bands warning for the sample.

Search Results

Result Spectrum

- $\text{SiO}_2\text{-MgO}$ Sol Silika Komersial



Lab. Terpadu UNDIP

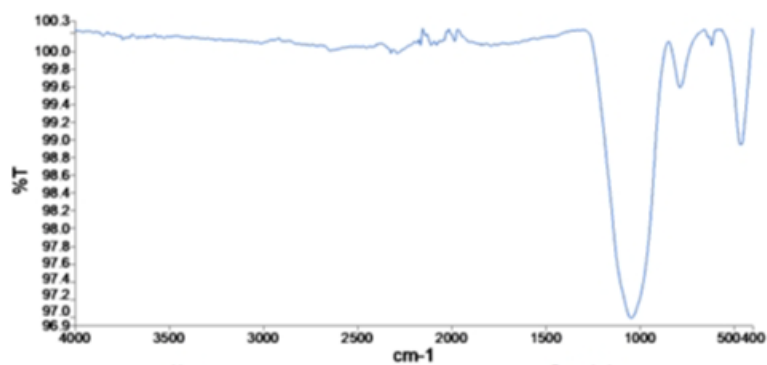
PerkinElmer Spectrum IR 10.6.1

December 7, 2023 20:24

Sample Details

Filename E:\Report Hasil analisis
FTIR\2023\Desember 2023\8 Desember
2023\SP23267614011\ (Komposit Hana, B1
)_1_1_1.sp
Creation Date 12/8/2023 7:12:11 AM
Analyst Administrator
X-Axis Units cm^{-1}
X-Axis start value 4000
X-Axis end value 400
Data interval -1
Number of points 3601
Y-Axis Units %T
Description Sample (Komposit Hana, B1) By
Administrator Date Friday, December 08
2023

Spectrum



Name (Komposit Hana, B1)_1_1_1 Description Sample (Komposit Hana, B1) By Administrator Date Friday, December 08

Summary

Sample Name	Description	Saved or unsaved State	Spectrum quality check summary
(Komposit Hana, B1)_1_1_1	Sample (Komposit Hana, B1) By Administrator Date Friday, December 08 2023	Saved	The Quality Checks give rise to a Weak Bands warning for the sample.

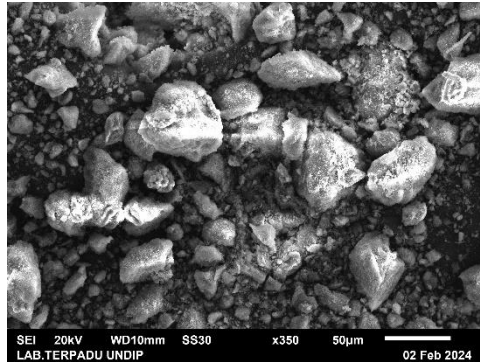
Search Results

Result Spectrum

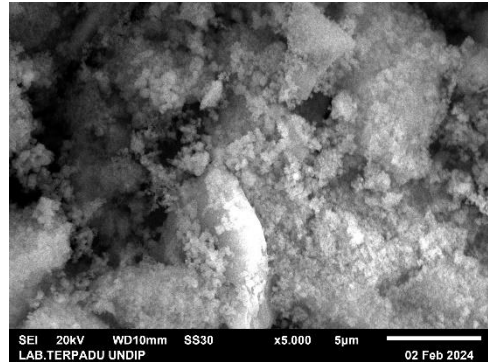
Hasil Analisis SEM-EDX

- SiO_2 -MgO Sol Silika Sintesis

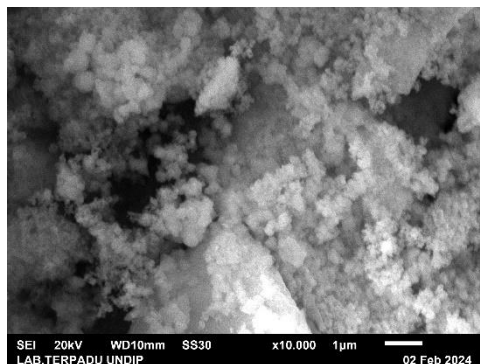
Gambar SEM dengan perbesaran:



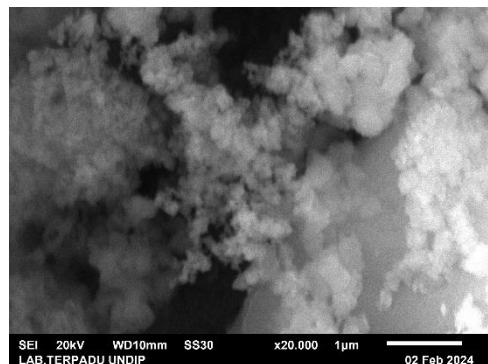
350x



5.000x

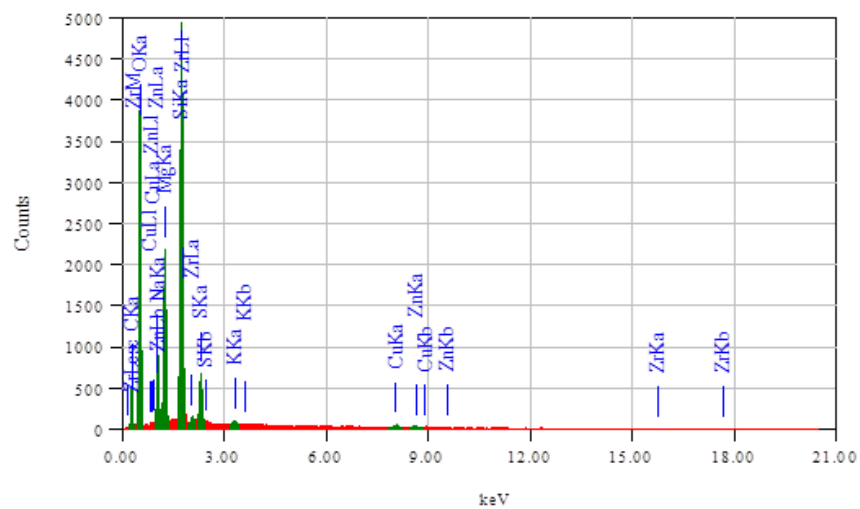


10.000x



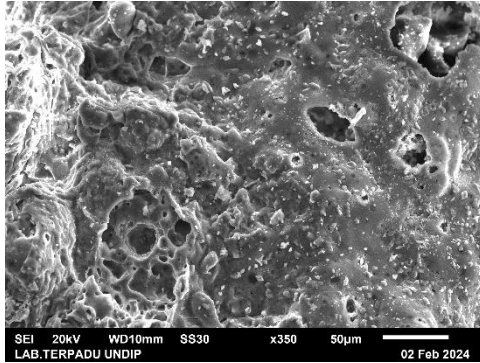
20.000x

Kurva EDX *Oxide*:

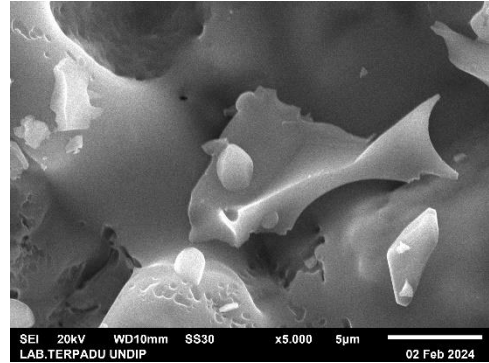


- **SiO₂-MgO Sol Silika Komersial**

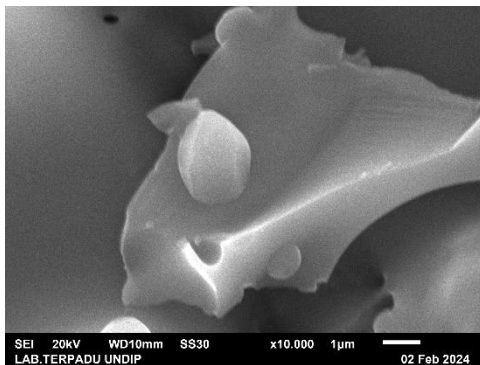
Gambar SEM dengan perbesaran:



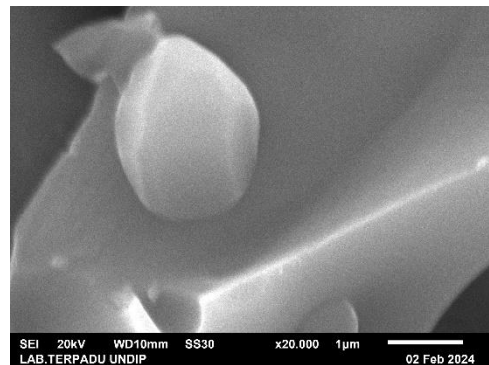
350x



5.000x

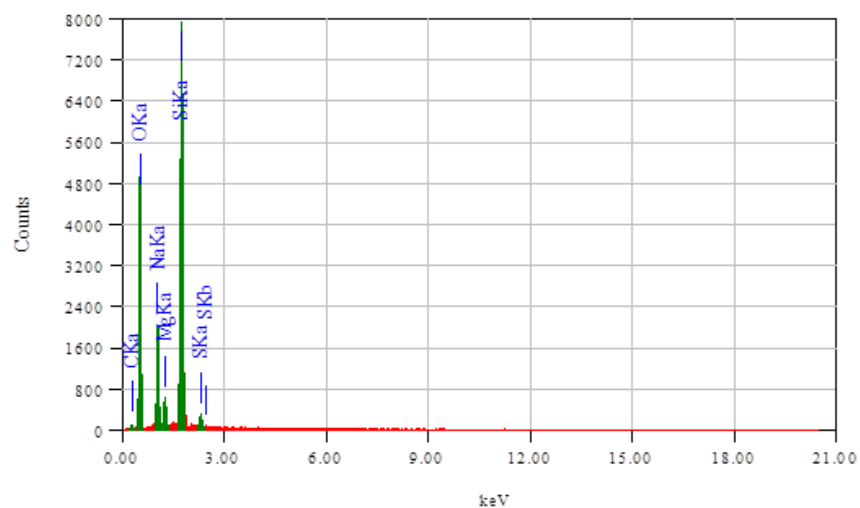


10.000x



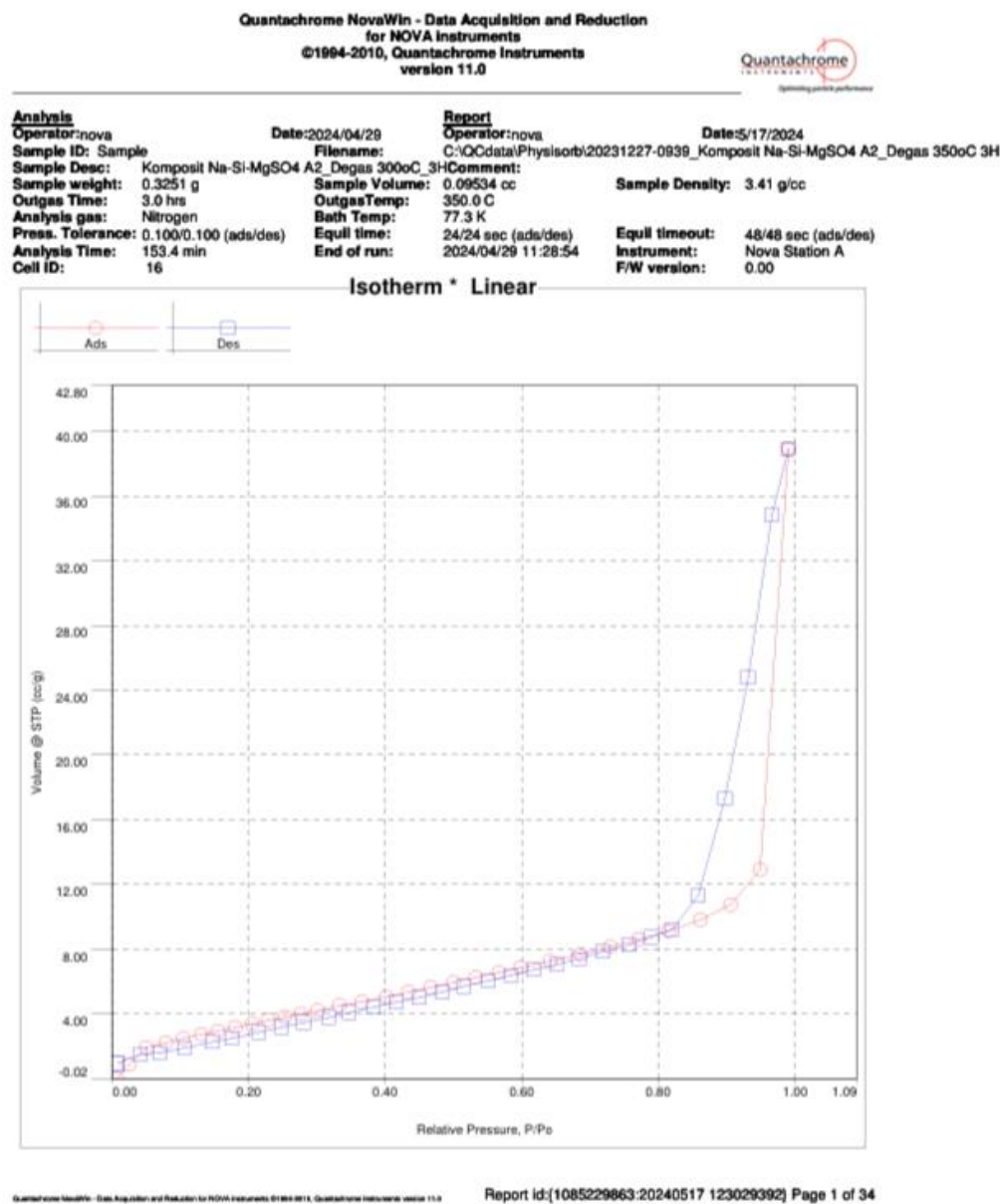
20.000x

Kurva EDX *Oxide*:



Hasil Analisis GSA

- SiO₂-MgO Sol Silika Sintesis



Analysis
Operator:nova
Sample ID: Sample

Date:2024/04/29
Filename:

Report
Operator:nova
Date:5/17/2024
C:\QCdata\Physisorb\20231227-0939_Komposit Na-Si-MgSO4 A2_Degas 350oC 3H

MBET summary

Slope = 232.629
Intercept = 1.232e+01
Correlation coefficient, r = 0.998800
C constant = 19.875
Surface Area = 14.217 m²/g

Average PoreSize data

Average pore Radius = 8.46121e+01 Å

Total Pore Volume data

Total Pore Volume

Total pore volume = 6.015e-02 cc/g
for pores smaller than 1040.3 Å (Radius)
at P/Po = 0.99070

Volume/Area summary

Surface Area Data

MultiPoint BET.....	1.422e+01 m ² /g
Langmuir surface area.....	6.927e+00 m ² /g
BJH method cumulative adsorption surface area.....	9.647e+00 m ² /g
BJH method cumulative desorption surface area.....	1.278e+01 m ² /g
DH method cumulative adsorption surface area.....	9.784e+00 m ² /g
DH method cumulative desorption surface area.....	1.292e+01 m ² /g
t-method external surface area.....	1.422e+01 m ² /g
DR method micropore area.....	1.454e+02 m ² /g

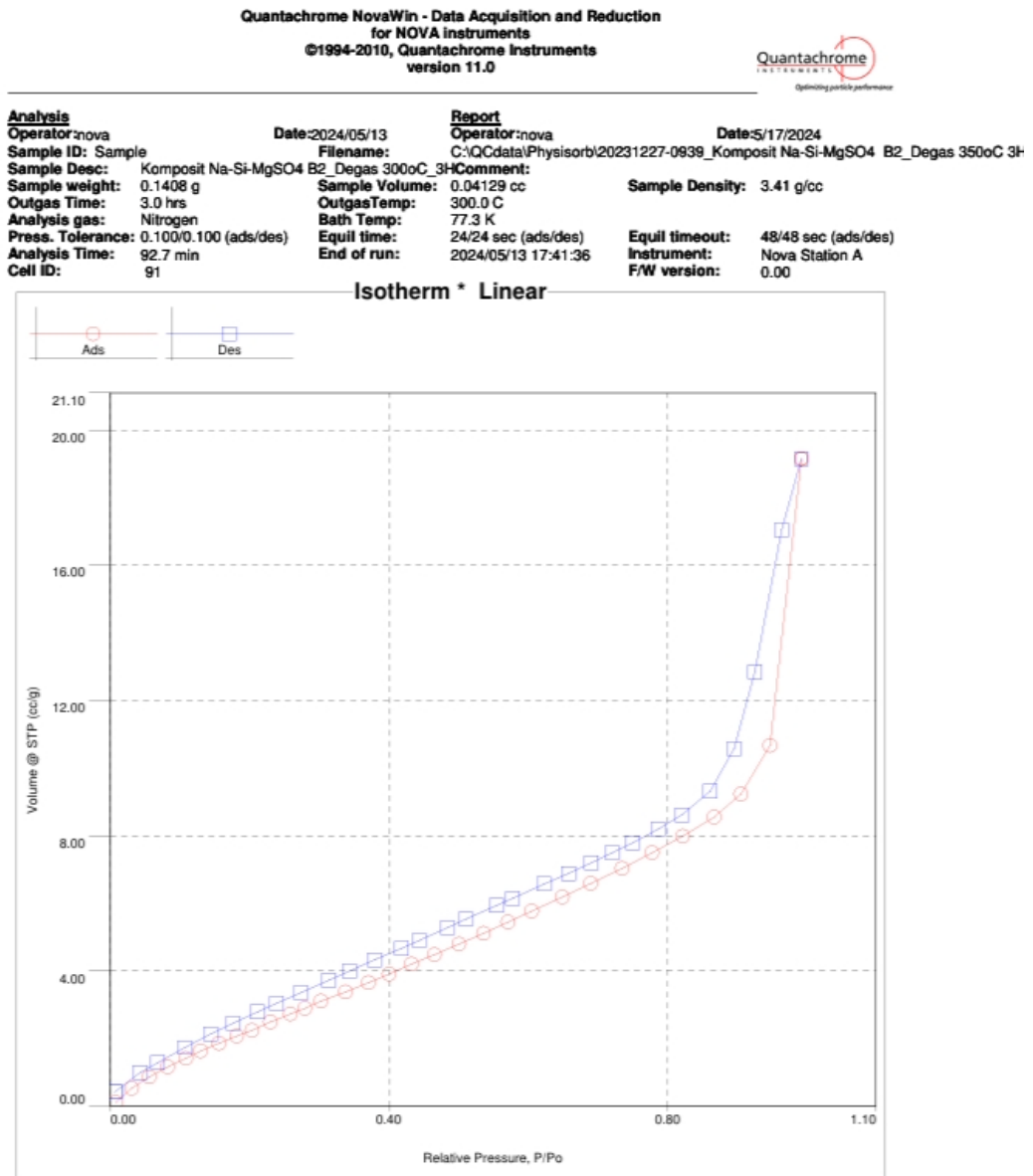
Pore Volume Data

Total pore volume for pores with Radius less than 1040.30 Å at P/Po = 0.990699.....	6.015e-02 cc/g
BJH method cumulative adsorption pore volume.....	5.750e-02 cc/g
BJH method cumulative desorption pore volume.....	5.997e-02 cc/g
DH method cumulative adsorption pore volume.....	5.582e-02 cc/g
DH method cumulative desorption pore volume.....	5.838e-02 cc/g
DR method micropore volume.....	5.166e-02 cc/g
HK method cumulative pore volume.....	4.559e-03 cc/g
SF method cumulative pore volume.....	4.760e-03 cc/g

Pore Size Data

Average pore Radius	8.461e+01 Å
BJH method adsorption pore Radius (Mode Dv(r)).....	1.555e+01 Å
BJH method desorption pore Radius (Mode Dv(r)).....	1.610e+01 Å
DH method adsorption pore Radius (Mode Dv(r)).....	1.555e+01 Å
DH method desorption pore Radius (Mode Dv(r)).....	1.610e+01 Å
DR method micropore Half pore width.....	6.222e+01 Å
DA method pore Radius (Mode).....	1.130e+01 Å
HK method pore Radius (Mode).....	6.287e+00 Å
SF method pore Radius (Mode).....	1.089e+01 Å

- SiO₂-MgO Sol Silika Komersial



Analysis
Operator:nova
Sample ID: Sample

Date:2024/05/13
Filename:

Report
Operator:nova
C:\QCdata\Physisorb\20231227-0939_Komposit Na-Si-MgSO4 B2_Degas 350oC 3H

Date:5/17/2024

MBET summary

Slope = 233.686
Intercept = 4.237e+01
Correlation coefficient, r = 0.998749
C constant = 6.515

Surface Area = 12.615 m²/g

Average PoreSize data

Average pore Radius = 4.69529e+01 Å

Total Pore Volume data

Total Pore Volume

Total pore volume = 2.962e-02 cc/g
for pores smaller than 1373.9 Å (Radius)
at P/Po = 0.99298

Volume/Area summary

Surface Area Data

MultiPoint BET.....	1.262e+01 m ² /g
Langmuir surface area.....	3.479e+01 m ² /g
BJH method cumulative adsorption surface area.....	8.944e+00 m ² /g
BJH method cumulative desorption surface area.....	9.450e+00 m ² /g
DH method cumulative adsorption surface area.....	9.084e+00 m ² /g
DH method cumulative desorption surface area.....	9.589e+00 m ² /g
t-method external surface area.....	1.262e+01 m ² /g
DR method micropore area.....	1.438e+01 m ² /g

Pore Volume Data

Total pore volume for pores with Radius less than 1373.90 Å at P/Po = 0.992980.....	2.962e-02 cc/g
BJH method cumulative adsorption pore volume.....	2.833e-02 cc/g
BJH method cumulative desorption pore volume.....	2.766e-02 cc/g
DH method cumulative adsorption pore volume.....	2.757e-02 cc/g
DH method cumulative desorption pore volume.....	2.695e-02 cc/g
DR method micropore volume.....	5.109e-03 cc/g
HK method cumulative pore volume.....	2.816e-03 cc/g
SF method cumulative pore volume.....	3.012e-03 cc/g

Pore Size Data

Average pore Radius	4.695e+01 Å
BJH method adsorption pore Radius (Mode Dv(r)).....	1.564e+01 Å
BJH method desorption pore Radius (Mode Dv(r)).....	1.609e+01 Å
DH method adsorption pore Radius (Mode Dv(r)).....	1.564e+01 Å
DH method desorption pore Radius (Mode Dv(r)).....	1.609e+01 Å
DR method micropore Half pore width.....	3.069e+01 Å
DA method pore Radius (Mode).....	1.260e+01 Å
HK method pore Radius (Mode).....	5.537e+00 Å
SF method pore Radius (Mode).....	1.070e+01 Å

Hasil Uji AAS Pb(II)

AAS 202401021943/R07022024/T28/Pb		
SampleID	Analyte	Mean
Blank	Pb 283.31	
Calib Std 1	Pb 283.31	
Calib Std 2	Pb 283.31	
Calib Std 3	Pb 283.31	
Calib Std 4	Pb 283.31	
Calib Std 8	Pb 283.31	
A1	Pb 283.31	0.00
A2	Pb 283.31	0.00
A3	Pb 283.31	3.074 mg/L
A4	Pb 283.31	2.333 mg/L
A5	Pb 283.31	2.813 mg/L
A6	Pb 283.31	3.959 mg/L
A7	Pb 283.31	1.241 mg/L
B1	Pb 283.31	3.043 mg/L
B2	Pb 283.31	5.251 mg/L
B3	Pb 283.31	1.950 mg/L
B4	Pb 283.31	1.041 mg/L
B5	Pb 283.31	18.52 mg/L
B6	Pb 283.31	44.51 mg/L
B7	Pb 283.31	68.67 mg/L
C1	Pb 283.31	0.153 mg/L

SampleID	Analyte	Mean
C2	Pb 283.31	1.295 mg/L
C3	Pb 283.31	8.526 mg/L
C4	Pb 283.31	13.34 mg/L
C5	Pb 283.31	7.043 mg/L
C6	Pb 283.31	3.298 mg/L
C7	Pb 283.31	0.932 mg/L
D1	Pb 283.31	4.220 mg/L
D2	Pb 283.31	1.238 mg/L
D3	Pb 283.31	3.379 mg/L
D4	Pb 283.31	2.344 mg/L
D5	Pb 283.31	4.817 mg/L
D6	Pb 283.31	33.10 mg/L
D7	Pb 283.31	64.76 mg/L

Hasil Uji AAS SiO₂



Nomor : 01030124B/LT-UIN/II/2024
Number

HASIL PENGUJIAN TEST RESULT

No	Label Pelanggan	Label Lab. Terpadu	Parameter	Hasil Uji	Satuan	Metode
1	Na Silikat - E	01030124-1	Si	111,1 ±1,7	mg/L	Spektrofotometri Serapan Atom
2	Na Silikat - F	01030124-2	Si	356.547 ±1	mg/L	Spektrofotometri Serapan Atom

Keterangan

Na Silikat E: Silika hasil sintesis

Na Silikat F: Silika komersial

Yogyakarta, 19 Februari 2024
Koordinator Teknis

Thorikul Huda, S.Si., M.Sc.
NIP. 052316003

Catatan : 1 Hasil pengujian ini hanya berlaku untuk sampel yang diuji
Notes The results are available exclusively to the tested samples
2. Sertifikat ini hanya dapat digandakan secara utuh
The certificate can be reproduced (copied) only for all this reported sheets
3. Pengambilan sampel diluar tanggung jawab Laboratorium Terpadu UIN
The Integrated Laboratory of UIN disclatmes all responsibility for the sampling