

LAMPIRAN

Lampiran 1. Proses Pembuatan Sintesis Komposit ZnO/C Sekam Padi



Pengukuran larutan Etanol pa dan aquademin



Penimbangan serbuk ZnO



Pengadukan serbuk ZnO, Etanol pa dan Aquademin dengan *magnetic stirrer*



Penimbangan karbon aktif



Pengadukan kedua dengan penambahan karbon aktif



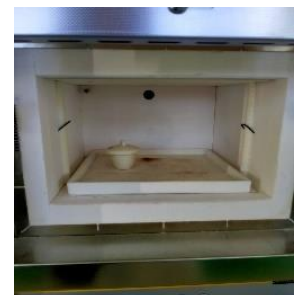
Proses hidrotermal dengan autoklaf



Pencucian dan penyaringan dengan aquademin hingga pH netral



Pengeringan dengan oven



Proses kalsinasi

Lampiran 2. Uji Efisiensi Adsorpsi variasi massa adsorben dan waktu kontak



Penimbangan hasil komposit ZnO/C sekam padi



Pencampuran dengan larutan *naphthol yellow*



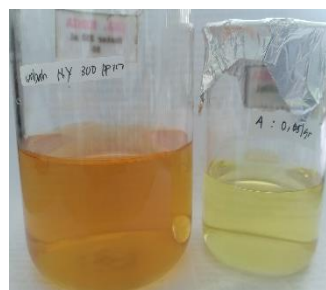
Pengadukan hasil komposit dan larutan *naphthol yellow* dengan *magnetic stirrer*



Penyaringan hasil campuran



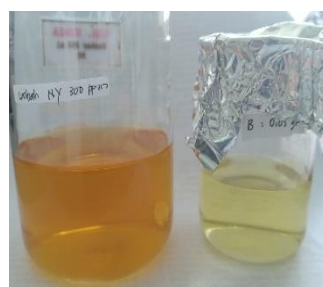
Naphthol yellow : sampel K5ZH 0,05 g



Naphthol yellow : sampel K5ZH 0,1 g



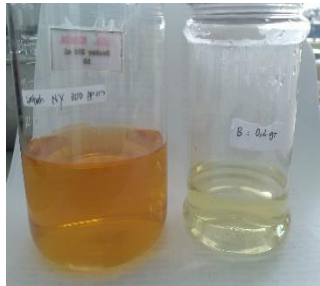
Naphthol yellow : sampel K5ZH 0,2 g



Naphthol yellow : sampel K10ZH 0,05 g



Naphthol yellow : sampel K10ZH 0,1 g



Naphthol yellow : sampel
K10ZH 0,2 g



Naphthol yellow : sampel
K10ZNH 0,05 g



Naphthol yellow : sampel
K10ZNH 0,1 g



Naphthol yellow : sampel
K10ZNH 0,2 g



Naphthol yellow : sampel
K10ZH 0,2 g 15 menit



Naphthol yellow : sampel
K10ZH 0,2 g 30 menit



Naphthol yellow : sampel
K10ZH 0,2 g 45 menit



Naphthol yellow : sampel
K10ZH 0,2 g 60 menit

Lampiran 3. Pengambilan Limbah Batik Asli



Pengambilan limbah batik asli

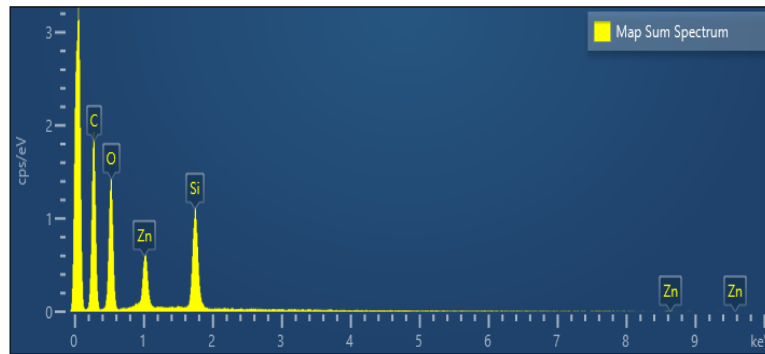


Limbah batik asli

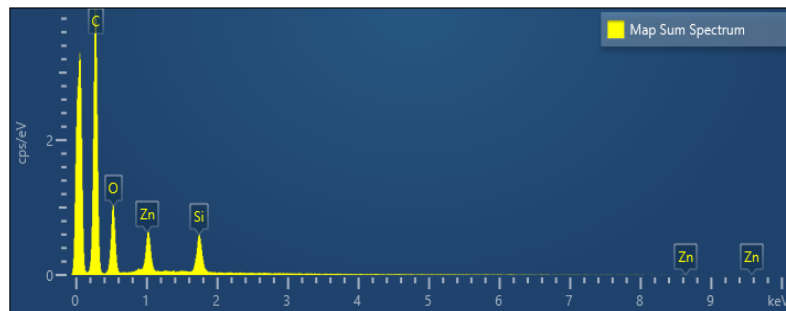


Tempat penampungan limbah batik

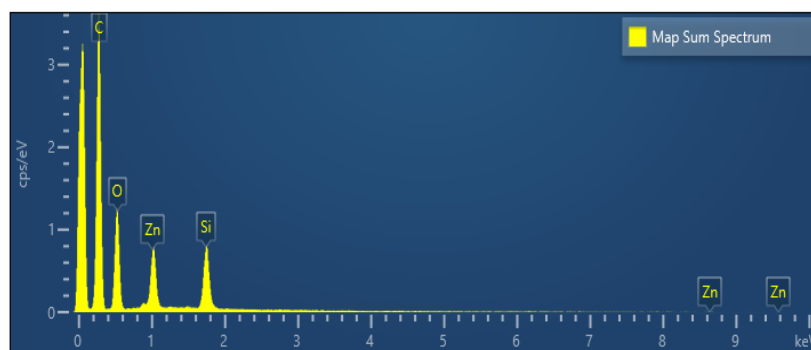
Lampiran 4. Hasil EDX



Sampel K5ZH



Sampel K10ZH



Sampel K10ZNH

Lampiran 5. Perhitungan

5.1 Adsorpsi dengan Variasi Massa Adsorben

| Nama Sampel | w (g) | t (menit) | Co (mg/L) | Abs | C_t (mg/L) | % teradsorpsi |
|--------------------|--------------|------------------|------------------|------------|-----------------------------|----------------------|
| K5ZH | 0.05 | 40 | 292,44 | 0,743 | 159,396 | 45,494 |
| | 0,1 | 40 | 292,44 | 0,544 | 117,883 | 59,689 |
| | 0,2 | 40 | 292,44 | 0,437 | 94,453 | 67,701 |
| K10ZH | 0.05 | 40 | 292,44 | 0,788 | 171.342 | 41,409 |
| | 0,1 | 40 | 292,44 | 0,555 | 120,294 | 58.865 |
| | 0,2 | 40 | 292,44 | 0,395 | 85,225 | 70,857 |
| K10ZNH | 0.05 | 40 | 292,44 | 0,968 | 210,86 | 27,896 |
| | 0,1 | 40 | 292,44 | 0,967 | 210,641 | 27,971 |
| | 0,2 | 40 | 292,44 | 0,888 | 193,348 | 33,884 |

5.2 Adsorpsi dengan variasi waktu kontak

| Nama Sampel | w (g) | t (menit) | Co (mg/L) | Abs | C_t (mg/L) | % teradsorpsi |
|--------------------|--------------|------------------|------------------|------------|-----------------------------|----------------------|
| K10ZN | 0,2 | 15 | 292,44 | 1,005 | 218,346 | 25,123 |
| | 0,2 | 30 | 292,44 | 0,763 | 165,928 | 43,260 |
| | 0,2 | 45 | 292,44 | 0,389 | 83,346 | 58,505 |
| | 0,2 | 60 | 292,44 | 0,266 | 56,995 | 80,510 |

5.3 Perhitungan

5.4 Pembuatan larutan induk *naphthol yellow* 300 ppm didalam labu ukur 1000 ml

$$300 \text{ ppm} = 300 \text{ mg/L}$$

$$300 \text{ ppm} = 300 \text{ mg}/1000 \text{ ml}$$

$$300 \text{ ppm} = x/1000 \text{ ml}$$

$$x = 0,3 \text{ gram}$$

4.5 Pembuatan larutan standar 100 ppm 100 ml

$$M_1 \cdot V_1 = M_2 \cdot V_2$$

$$300 \text{ ppm} \cdot V_1 = 100 \text{ ppm} \cdot 100 \text{ ml} = 33,3 \text{ ml}$$

5.6 Perhitungan Efisiensi adsorpsi variasi massa

a. Sampel K5ZH

$$1. \text{ Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 159,396 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 45,494\%$$

$$2. \text{ Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 117,883 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 59,689\%$$

$$3. \text{ Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 94,453 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 67,701\%$$

b. Sampel K10ZH

$$1. \text{ Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 171,342 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 41,409\%$$

$$2. \text{ Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 120,249 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 58,865\%$$

$$3. \text{ Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 85,225 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 70,857\%$$

c. Sampel K10ZNH

$$1. \text{ Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 210,86 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 27,896\%$$

$$2. \text{ Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 210,641 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 27,971\%$$

$$3. \text{ Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 193,348 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 33,884\%$$

5.7 Perhitungan efisiensi adsorpsi variasi waktu kontak Sampel K10ZH (0,2 gram)

a. Waktu kontak 15 menit

$$\text{Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 218,97 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 25,123\%$$

b. Waktu kontak 30 menit

$$\text{Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 165,928 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 43,260\%$$

c. Waktu kontak 45 menit

$$\text{Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 83,346 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 71,499\%$$

d. Waktu kontak 60 menit

$$\text{Efisiensi adsorpsi (\%)} = \frac{(C_o - C_e)}{C_o} \times 100\% = \frac{(292,44 \text{ ppm} - 56,995 \text{ ppm})}{292,44 \text{ ppm}} \times 100\% \\ = 80,510\%$$

Lampiran 6. Biodata Penulis



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Riwayat Pendidikan

1. SD Negeri Kejawang (2006 – 2012)
2. SMP Negeri 1 Karanganyar (2012 – 2015)
3. SMA Negeri 1 Karanganyar (2015 – 2018)
4. Politeknik Negeri Cilacap (2020 – 2024)