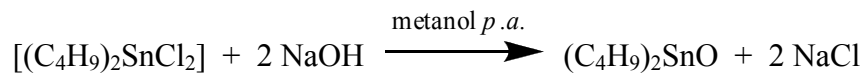


Lampiran 2. Perhitungan Persentase Berat Senyawa Hasil Sintesis

1. Persentase berat senyawa dibutyltin(IV) oksida $[(C_4H_9)_2SnO]$ hasil sintesis

Reaksi :



$$\text{Mol } [(C_4H_9)_2SnCl_2] = \text{mol } (C_4H_9)_2SnO$$

$$\text{Mol } [(C_4H_9)_2SnCl_2] = 0,045 \text{ mol}$$

$$\text{BM } [(C_4H_9)_2SnO] = 304 \text{ gram/mol}$$

$$\begin{aligned} \text{Berat } [(C_4H_9)_2SnO] &= \text{mol } (C_4H_9)_2SnCl_2 \times \text{BM } (C_4H_9)_2SnO \\ &= 0,045 \text{ mol} \times 249 \text{ gram/mol} \\ &= 11,205 \text{ gram} \end{aligned}$$

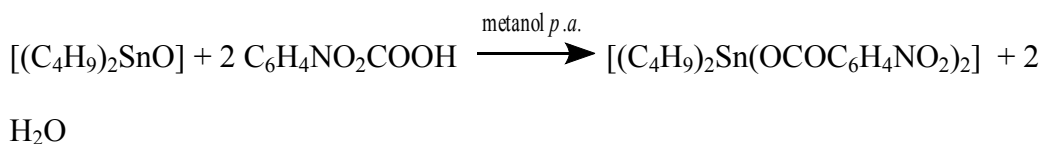
$$\text{Berat } (C_4H_9)_2SnO \text{ secara teoritis} = a = 11,205 \text{ gram}$$

$$\text{Berat } (C_4H_9)_2SnO \text{ hasil sintesis} = b = 11,085 \text{ gram}$$

$$\begin{aligned} \text{Persen } (C_4H_9)_2Sn(OH)_2 &= \left(\frac{b}{a} \right) \times 100 \% \\ &= \left(\frac{11\,085}{11\,205} \right) \times 100 \% \\ &= 98,93 \% \end{aligned}$$

2. Persentase berat senyawa dibutyltimah(IV) di-4-nitrobenzoat
 $[(C_4H_9)_2Sn(OCOC_6H_4NO_2)_2]$

Reaksi :



Dimana :

$$\begin{aligned} [(C_4H_9)_2SnO] &= \text{Dibutyltimah(IV) oksida} \\ C_6H_4NO_2COOH &= \text{Asam 4-nitrobenzoat} \\ [(C_4H_9)_2Sn(OCOC_6H_4NO_2)_2] &= \text{Dibutyltimah(IV) di-4-nitrobenzoat} \\ \text{Mol } [(C_4H_9)_2SnO] &= 0,003 \text{ mol} \\ \text{BM } [(C_4H_9)_2Sn(OCOC_6H_4NO_2)_2] &= 565 \text{ gram/mol} \\ \text{Mol } [(C_4H_9)_2SnO] &= \text{mol } [(C_4H_9)_2Sn(OCOC_6H_4NO_2)_2] \\ \text{Berat } [(C_6H_5)_2Sn(OCOC_6H_5)_2] &= \text{mol } [(C_6H_5)_2Sn(OH)_2] \times \text{BM} \\ &\quad (C_6H_5)_2Sn(OCOC_6H_4NO_2)_2 \\ &= 0,003 \text{ mol} \times 565 \text{ gram/mol} \\ &= 1,695 \text{ gram} \end{aligned}$$

Jadi, berat dibutyltimah(IV) di-4-nitrobenzoat secara teoritis adalah 1,695 gram.

1. Waktu refluks 3 jam

Berat $[(C_4H_9)_2Sn(OCOC_6H_4(NO_2)_2)]$ hasil sintesis = a = 1,4286 gram

Berat $[(C_4H_9)_2Sn(OCOC_6H_4(NO_2)_2)]$ teoritis = b = 1,695 gram

$$\begin{aligned}\text{Persen Berat } [(C_4H_9)_2Sn(OCOC_6H_4(NO_2)_2)] &= (a / b) \times 100 \% \\ &= (1,4286g)/(1,695 \text{ g}) \times 100 \% \\ &= 84,28 \%\end{aligned}$$

Jadi, persen dibutyltin(IV) di-4-nitrobenzoat pada waktu refluks 3 jam adalah 84,24 %.

2. Waktu refluks 4 jam

Berat $[(C_4H_9)_2Sn(OCOC_6H_4(NO_2)_2)]$ hasil sintesis = a = 1,4793 gram

Berat $[(C_4H_9)_2Sn(OCOC_6H_4OH)_2]$ teoritis = b = 1,695 gram

$$\begin{aligned}\text{Persen Berat } [(C_4H_9)_2Sn(OCOC_6H_4(NO_2)_2)] &= (a / b) \times 100 \% \\ &= (1,4793 \text{ g})/(1,695 \text{ g}) \times 100 \% \\ &= 87,27 \%\end{aligned}$$

Jadi, persen dibutyltin(IV) di-4-nitrobenzoat pada waktu refluks 4 jam adalah 87,27 %.

3. Waktu refluks 5 jam

Berat $[(C_4H_9)_2Sn(OCOC_6H_4OH)_2]$ hasil sintesis = a = 1,4135 gram

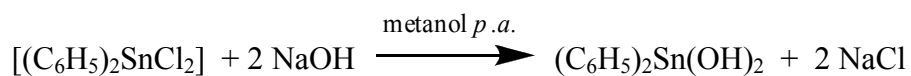
Berat $[(C_4H_9)_2Sn(OCOC_6H_4OH)_2]$ teoritis = b = 1,695 gram

$$\begin{aligned}\text{Persen Berat } [(C_4H_9)_2Sn(OCOC_6H_4(NO)_2)] &= (a / b) \times 100 \% \\ &= (1,4135 \text{ g})/(1,695 \text{ g}) \times 100 \% \\ &= 83,93 \%\end{aligned}$$

Jadi, persen dibutyltin(IV) di-4-nitrobenzoat pada waktu refluks 5 jam adalah 83,93 %.

3. **Persentase berat senyawa difeniltimah(IV) dihidroksida [(C₆H₅)₂Sn(OH)₂ hasil sintesis.**

Reaksi :



$$\text{Mol } [(\text{C}_6\text{H}_5)_2\text{SnCl}_2] = \text{mol } (\text{C}_6\text{H}_5)_2\text{Sn}(\text{OH})_2$$

$$\text{Mol } [(\text{C}_6\text{H}_5)_2\text{SnCl}_2] = 0,045 \text{ mol}$$

$$\text{BM } [(\text{C}_6\text{H}_5)_2\text{Sn}(\text{OH})_2] = 307 \text{ gram/mol}$$

$$\begin{aligned} \text{Berat } [(\text{C}_6\text{H}_5)_2\text{Sn}(\text{OH})_2] &= \text{mol } (\text{C}_6\text{H}_5)_2\text{SnCl}_2 \times \text{BM } (\text{C}_6\text{H}_5)_2\text{Sn}(\text{OH})_2 \\ &= 0,045 \text{ mol} \times 307 \text{ gram/mol} \\ &= 13,815 \text{ gram} \end{aligned}$$

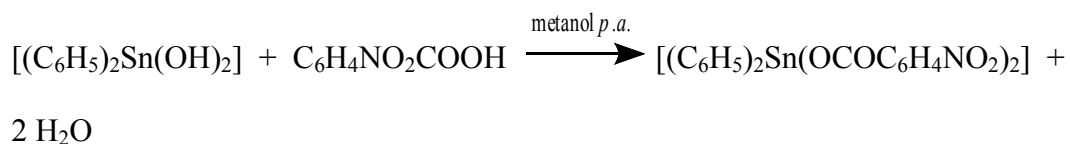
$$\text{Berat } (\text{C}_6\text{H}_5)_2\text{Sn}(\text{OH})_2 \text{ secara teoritis} = a = 13,815 \text{ gram}$$

$$\text{Berat } (\text{C}_6\text{H}_5)_2\text{Sn}(\text{OH})_2 \text{ hasil sintesis} = b = 15,5698 \text{ gram}$$

$$\begin{aligned} \text{Persen } (\text{C}_6\text{H}_5)_2\text{SnOH} &= \left(\frac{b}{a} \right) \times 100 \% \\ &= \left(\frac{15\,569\,8}{13\,815} \right) \times 100\% \\ &= 98,26 \% \end{aligned}$$

4. Persentase berat senyawa difeniltimah(IV) di-4-nitrobenzoat
 $[(C_6H_5)_2Sn(OCOC_6H_4NO_2)_2]$

Reaksi :



Dimana :

$[(C_6H_5)_2Sn(OH)_2]$ = Difeniltimah(IV) dihidroksida

$C_6H_4NO_2COOH$ = Asam 4-nitrobenzoat

$[(C_6H_5)_2Sn(OCOC_6H_4NO_2)_2]$ = Difeniltimah(IV) di-4-nitrobenzoat

Mol $[(C_6H_5)_2Sn(OH)_2]$ = 0,003 mol

BM $[(C_6H_5)_2Sn(OCOC_6H_4NO_2)_2]$ = 605 gram/mol

Mol $[(C_6H_5)_2Sn(OH)_2]$ = mol $[(C_6H_5)_2Sn(OCOC_6H_4NO_2)_2]$

Berat $[(C_6H_5)_2Sn(OCOC_6H_4NO_2)_2]$ = mol $[(C_6H_5)_2Sn(OH)_2]$ x

BM $[(C_6H_5)_2Sn(OCOC_6H_4NO_2)_2]$

= 0,003 mol x 605 gram/mol

= 1,815 gram

Jadi, berat difeniltimah(IV) 4-nitrobenzoat secara teoritis adalah 1,815 gram.

1. Waktu refluks 3 jam

Berat $[(C_6H_5)_2Sn(OCOC_6H_4(NO_2)_2)]$ hasil sintesis = a = 1,5290 gram

Berat $[(C_6H_5)_2Sn(OCOC_6H_4(NO_2)_2)]$ teoritis = b = 1,815 gram

$$\begin{aligned}\text{Persen Berat } [(C_6H_5)_2Sn(OCOC_6H_4(NO_2)_2)] &= (a / b) \times 100 \% \\ &= (1,5290 \text{ g}) / (1,815 \text{ g}) \times 100 \% \\ &= 84,24 \%\end{aligned}$$

Jadi, persen difeniltimah(IV) di-4-nitrobenzoat pada waktu refluks 3 jam adalah 84,24 %.

2. Waktu refluks 4 jam

Berat $[(C_6H_5)_2Sn(OCOC_6H_4(NO_2)_2)]$ hasil sintesis = a = 1,6023 gram

Berat $[(C_6H_5)_2Sn(OCOC_6H_4(NO_2)_2)]$ teoritis = b = 1,815 gram

$$\begin{aligned}\text{Persen Berat } [(C_6H_5)_2Sn(OCOC_6H_4(NO_2)_2)] &= (a / b) \times 100 \% \\ &= (1,6023 \text{ g}) / (1,815 \text{ g}) \times 100 \% \\ &= 88,33\%\end{aligned}$$

Jadi, persen difeniltimah(IV) di-4-nitrobenzoat pada waktu refluks 4 jam adalah 88,33 %.

3. Waktu refluks 5 jam

Berat $[(C_6H_5)_2Sn(OCOC_6H_4(NO_2)_2)]$ hasil sintesis = a = 1,5236 gram

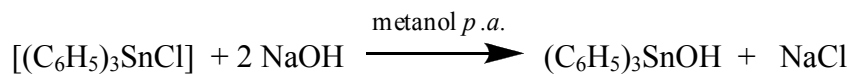
Berat $[(C_6H_5)_2Sn(OCOC_6H_4(OH)_2)]$ teoritis = b = 1,815 gram

$$\begin{aligned}\text{Persen Berat } [(C_6H_5)_2Sn(OCOC_6H_4(NO_2)_2)] &= (a / b) \times 100 \% \\ &= (1,5236 \text{ g}) / (1,815 \text{ g}) \times 100 \% \\ &= 83,94 \%\end{aligned}$$

Jadi, persen difeniltimah(IV) di-4-nitrobenzoat pada waktu refluks 5 jam adalah 83,94 %.

5. **Persentase berat senyawa Trifeniltimah(IV) hidroksida [(C₆H₅)₃SnOH] hasil sintesis.**

Reaksi :



$$\text{Mol } [(\text{C}_6\text{H}_5)_3\text{SnCl}] = \text{mol } (\text{C}_6\text{H}_5)_3\text{SnOH}$$

$$\text{Mol } [(\text{C}_6\text{H}_5)_3\text{SnCl}] = 0,045 \text{ mol}$$

$$\text{BM } [(\text{C}_6\text{H}_5)_3\text{SnOH}] = 367 \text{ gram/mol}$$

$$\text{Berat } [(\text{C}_6\text{H}_5)_3\text{SnOH}] = \text{mol } (\text{C}_6\text{H}_5)_3\text{SnCl} \times \text{BM } (\text{C}_6\text{H}_5)_3\text{SnOH}$$

$$= 0,045 \text{ mol} \times 367 \text{ gram/mol}$$

$$= 16,515 \text{ gram}$$

$$\text{Berat } (\text{C}_6\text{H}_5)_3\text{SnOH} \text{ secara teoritis} = a = 16,515 \text{ gram}$$

$$\text{Berat } (\text{C}_6\text{H}_5)_3\text{SnOH} \text{ hasil sintesis} = b = 15,3082 \text{ gram}$$

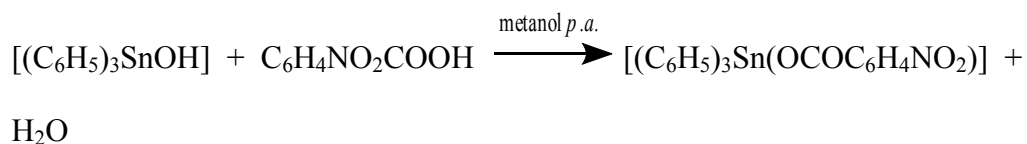
$$\text{Persen } (\text{C}_6\text{H}_5)_3\text{SnOH} = \left(\frac{b}{a} \right) \times 100 \%$$

$$= \left(\frac{15,3082}{16,515} \right) \times 100\%$$

$$= 92,72 \%$$

6. Persentase berat trifeniltimah(IV) 4-nitrobenzoat
 $[(C_6H_5)_3Sn(OCOC_6H_4NO_2)]$

Reaksi :



Dimana :

$$\begin{aligned} [(C_6H_5)_3Sn(OH)] &= \text{Trifeniltimah(IV) hidroksida} \\ C_6H_4NO_2COOH &= \text{Asam 4-nitrobenzoat} \\ [(C_6H_5)_3Sn(OCOC_6H_4NO_2)] &= \text{Trifeniltimah(IV) 4-nitrobenzoat} \\ \text{Mol } [(C_6H_5)_3SnOH] &= 0,003 \text{ mol} \\ \text{BM } [(C_6H_5)_3Sn(OCOC_6H_4NO_2)] &= 516 \text{ gram/mol} \\ \text{Mol } [(C_6H_5)_3SnOH] &= \text{mol } [(C_6H_5)_3Sn(OCOC_6H_4NO_2)] \\ \text{Berat } [(C_6H_5)_3Sn(OCOC_6H_4NO_2)] &= \text{mol } [(C_6H_5)_3SnOH] \times \\ &\quad \text{BM } [(C_6H_5)_3Sn(OCOC_6H_4NO_2)] \\ &= 0,003 \text{ mol} \times 516 \text{ gram/mol} \\ &= 1,548 \text{ gram} \end{aligned}$$

Jadi, berat trifeniltimah(IV) 4-nitrobenzoat secara teoritis adalah 1,548 gram.

1. Waktu refluks 3 jam

Berat $[(C_6H_5)_3Sn(OCOC_6H_4(NO_2))]$ hasil sintesis = a = 1,2786 gram

Berat $[(C_6H_5)_3Sn(OCOC_6H_4(NO_2))]$ teoritis = b = 1,548 gram

$$\begin{aligned}\text{Persen Berat } [(C_6H_5)_3Sn(OCOC_6H_4(NO_2))] &= (a / b) \times 100 \% \\ &= (1,2786 \text{ g}) / (1,548 \text{ g}) \times 100 \% \\ &= 82,55 \%\end{aligned}$$

Jadi, persen trifeniltimah(IV) 4-nitrobenzoat pada waktu refluks 3 jam adalah 82,55 %.

2. Waktu refluks 4 jam

Berat $[(C_6H_5)_3Sn(OCOC_6H_4(NO_2))]$ hasil sintesis = a = 1,3396 gram

Berat $[(C_6H_5)_2Sn(OCOC_6H_4(NO_2))]$ teoritis = b = 1,548 gram

$$\begin{aligned}\text{Persen Berat } [(C_6H_5)_3Sn(OCOC_6H_4(NO_2))] &= (a / b) \times 100 \% \\ &= (1,3396 \text{ g}) / (1,548 \text{ g}) \times 100 \% \\ &= 86,53 \%\end{aligned}$$

Jadi, persen trifeniltimah(IV) 4-nitrobenzoat pada waktu refluks 4 jam adalah 86,53 %.

3. Waktu refluks 5 jam

Berat $[(C_6H_5)_3Sn(OCOC_6H_4(NO_2))]$ hasil sintesis = a = 1,2923 gram

Berat $[(C_6H_5)_2Sn(OCOC_6H_4OH)]$ teoritis = b = 1,548 gram

$$\begin{aligned}\text{Persen Berat } [(C_6H_5)_3Sn(OCOC_6H_4(NO_2))] &= (a / b) \times 100 \% \\ &= (1,2923 \text{ g}) / (1,548 \text{ g}) \times 100 \% \\ &= 83,48 \%\end{aligned}$$

Jadi, persen trifeniltimah(IV) 4-nitrobenzoat pada waktu refluks 5 jam adalah 83,48 %.