

PERHITUNGAN

1. Menentukan densitas produk katalis 5 gr suhu 200⁰C

Berat piknometer kosong : 62,1 gram

Berat piknometer + air : 162,64 gram

Berat piknometer + sampel : 147,66 gram

$$\rho_{\text{air}} = \frac{(\text{berat piknometer} + \text{air}) - (\text{Berat piknometer kosong})}{V_{\text{air}}}$$

$$1 \text{ gr/ml} = \frac{(162,64 - 62,1) \text{ gram}}{V_{\text{air}}}$$

$$1 \text{ gr/ml} = \frac{100,54 \text{ gram}}{V_{\text{air}}}$$

$$V_{\text{air}} = 100,54 \text{ ml}$$

$$\rho_{\text{sampel}} = \frac{(\text{berat piknometer} + \text{sampel}) - (\text{Berat piknometer kosong})}{V_{\text{air}}}$$

$$= \frac{(147,66 - 62,1) \text{ gram}}{100,54 \text{ ml}}$$

$$= \frac{85,56 \text{ gram}}{100,54 \text{ ml}}$$

$$= 0,851 \text{ gr/ml}$$

Menentukan densitas produk katalis 5 gr suhu 250⁰C

Berat piknometer kosong : 62,1 gram

Berat piknometer + air : 162,64 gram

Berat piknometer + sampel : 147,66 gram

$$\rho_{\text{air}} = \frac{(\text{berat piknometer} + \text{air}) - (\text{Berat piknometer kosong})}{V_{\text{air}}}$$

$$1 \text{ gr/ml} = \frac{(162,64 - 62,1) \text{ gram}}{V_{\text{air}}}$$

$$1 \text{ gr/ml} = \frac{100,54 \text{ gram}}{V_{\text{air}}}$$

$$V_{\text{air}} = 100,54 \text{ ml}$$

$$\rho_{\text{sampel}} = \frac{(\text{berat piknometer} + \text{sampel}) - (\text{Berat piknometer kosong})}{V_{\text{air}}}$$

$$\begin{aligned}
 &= \frac{(151,80 - 62,1) \text{ gram}}{100,54 \text{ ml}} \\
 &= \frac{89,7 \text{ gram}}{100,54 \text{ ml}} \\
 &= 0,892 \text{ gr/ml}
 \end{aligned}$$

2. Menentukan nilai Spgr produk katalis 5 gr suhu 200⁰C

$$\begin{aligned}
 \text{Spgr} &: \frac{\rho \text{ sampel}}{\rho \text{ air}} \\
 &: \frac{0,851 \text{ gr/ml}}{1 \text{ gr/ml}} \\
 &: 0,851
 \end{aligned}$$

Menentukan nilai Spgr produk katalis 5 gr suhu 250⁰C

$$\begin{aligned}
 \text{Spgr} &: \frac{\rho \text{ sampel}}{\rho \text{ air}} \\
 &: \frac{0,892 \text{ gr/ml}}{1 \text{ gr/ml}} \\
 &: 0,892
 \end{aligned}$$

3. Menentukan °API produk katalis 5 gr suhu 200⁰C

$$\begin{aligned}
 \text{°API} &: \frac{141,5}{\text{spgr}} - 131,5 \\
 &: \frac{141,5}{0,851} - 131,5 \\
 &: 166,27 - 131,5 \\
 &: 34,78
 \end{aligned}$$

Menentukan °API produk katalis 5 gr suhu 200⁰C

$$\begin{aligned}
 \text{°API} &: \frac{141,5}{\text{spgr}} - 131,5 \\
 &: \frac{141,5}{0,892} - 131,5 \\
 &: 158,63 - 131,5 \\
 &: 27,13
 \end{aligned}$$

Untuk perhitungan nilai densitas, spgr, dan $^{\circ}$ API katalis 5,10,15,20,25 gr dapat dilihat pada tabel tabulasi berikut ini

Tabel 16. Data hasil perhitungan berat jenis, spgr, dan $^{\circ}$ API

Run	Berat Katalis	Berat Jenis		spgr		$^{\circ}$ API	
		200 $^{\circ}$ C	250 $^{\circ}$ C	200 $^{\circ}$ C	250 $^{\circ}$ C	200 $^{\circ}$ C	250 $^{\circ}$ C
1	5	0,851	0,892	0,851	0,892	34,78	27,13
2	10	0,854	0,851	0,854	0,851	34,19	34,58
3	15	0,855	0,864	0,855	0,864	34,0	32,08
4	20	0,867	0,875	0,867	0,875	31,71	30,21
5	25	0,866	0,863	0,863	0,863	31,89	32,46

4. Perhitungan % konversi suhu 250 $^{\circ}$ C

Massa produk katalis 5 gram = ρ sampel \times volume produk

$$0,892 \text{ gr/ml} \times 598 \text{ ml} = 533,41 \text{ gr}$$

m produk bahan bakar cair = 533,41 gr

massa isopren = m bahan baku- sisa padatan

$$= 1000 \text{ gr} - 100,452 \text{ gr}$$

$$= 899,548 \text{ gr}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\% \text{ konversi} = \frac{\text{massa produk bahan bakar cair}}{\text{massa isopren}} \times 100 \%$$

$$= \frac{533,41}{899,548} \times 100 \% = 59 \%$$

% konversi katalis 10 gr

Diketahui : m produk bahan bakar cair = 562,32 gr

Massa isopren = m bahan baku- sisa padatan

$$= 1000\text{gr} - 197,1236 \text{ gr}$$

$$= 802,87 \text{ gr}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\begin{aligned} \% \text{ konversi} &= \frac{\text{massa produk bahan bakar cair}}{\text{massa isopren}} \times 100 \% \\ &= \frac{562,32}{802,87} \times 100 \% = 70 \% \end{aligned}$$

% konversi katalis 15 gr

Diketahui : m produk bahan bakar cair = 722,02 gr

m. isoprene = m bahan baku- sisa padatan

$$= 1000 \text{ gr} - 30,6879 \text{ gr}$$

$$= 969,31 \text{ gr}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\begin{aligned} \% \text{ konversi} &= \frac{\text{massa produk bahan bakar cair}}{\text{massa isoprene}} \times 100 \% \\ &= \frac{722,02}{969,31} \times 100 \% = 74 \% \end{aligned}$$

% konversi katalis 20 gr

Diketahui : m produk bahan bakar cair = 679 gr

m isopren = m bahan baku- sisa padatan

$$= 1000 \text{ gr} - 68,4927 \text{ gr}$$

$$= 931.5073 \text{ gr}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\begin{aligned} \% \text{ konversi} &= \frac{\text{massa produk bahan bakar cair}}{\text{massa isopren}} \times 100 \% \\ &= \frac{679}{931,5073} \times 100 \% = 72 \% \end{aligned}$$

% konversi 25 gr

Diketahui : m produk bahan bakar cair = 625,89 gr

$$\begin{aligned} \text{m isopren} &= \text{m bahan baku- sisa padatan} \\ &= 1000 \text{ gr} - 71,3935 \text{ gr} \\ &= 928,3935 \text{ gr} \end{aligned}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\begin{aligned} \% \text{ konversi} &= \frac{\text{massa produk bahan bakar cair}}{\text{massa isopren}} \times 100 \% \\ &= \frac{625,89}{928,39} \times 100 \% = 67 \% \end{aligned}$$

% konversi suhu 200⁰ C

% konversi katalis 5 gr

Diketahui : m produk bahan bakar cair = 292,74 gr

$$\begin{aligned} \text{m isopren} &= \text{m bahan baku- sisa padatan} \\ &= 1000 \text{ gr} - 300,78 \text{ gr} \\ &= 699,22 \text{ gr} \end{aligned}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\begin{aligned} \% \text{ konversi} &= \frac{\text{massa produk bahan bakar cair}}{\text{massa isopren}} \times 100 \% \\ &= \frac{292,74}{699,22} \times 100 \% = 41 \% \end{aligned}$$

% konversi katalis 10 gr

Diketahui : m produk bahan bakar cair = 330,49 gr

$$\begin{aligned} \text{m isopren} &= \text{m bahan baku- sisa padatan} \\ &= 1000 \text{ gr} - 261,53 \text{ gr} \\ &= 738,47 \text{ gr} \end{aligned}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\begin{aligned}\% \text{ konversi} &= \frac{\text{massa produk bahan bakar cair}}{\text{massa isopren}} \times 100 \% \\ &= \frac{330,49}{738,47} \times 100 \% = 44 \%\end{aligned}$$

% konversi katalis 15 gr

Diketahui : m produk bahan bakar cair = 393,3 gr

$$\begin{aligned}\text{m isopren} &= \text{m bahan baku- sisa padatan} \\ &= 1000 \text{ gr} - 180,96 \text{ gr} \\ &= 819,04 \text{ gr}\end{aligned}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\begin{aligned}\% \text{ konversi} &= \frac{\text{massa produk bahan bakar cair}}{\text{massa isopren}} \times 100 \% \\ &= \frac{393,3}{819,04} \times 100 \% = 48 \%\end{aligned}$$

% konversi katalis 20 gr

Diketahui : m produk bahan bakar cair = 507,19 gr

$$\begin{aligned}\text{m isopren} &= \text{m bahan baku- sisa padatan} \\ &= 1000 \text{ gr} - 123,039 \text{ gr} \\ &= 876,961 \text{ gr}\end{aligned}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\begin{aligned}\% \text{ konversi} &= \frac{\text{massa produk bahan bakar cair}}{\text{massa isopren}} \times 100 \% \\ &= \frac{507,19}{876,961} \times 100 \% = 57 \%\end{aligned}$$

% konversi katalis 25 gr

Diketahui : m produk bahan bakar cair = 350,73 gr

m isopren = m bahan baku- sisa padatan

$$= 1000 \text{ gr} - 275,075 \text{ gr}$$

$$= 724,925 \text{ gr}$$

Ditanya : % konversi.....?

Penyelesaian :

$$\% \text{ konversi} = \frac{\text{massa produk bahan bakar cair}}{\text{massa isopren}} \times 100 \%$$

$$= \frac{350,73}{724,925} \times 100 \% = 48 \%$$