

LATIHAN 5

Jawablah pertanyaan berikut dengan benar di lembar kerja yang disediakan!



1. Pada reaksi 25 mL larutan HCl 1 M dengan 50 mL larutan NaOH 0,5 M terjadi kenaikan temperatur sebesar 3°C. Apabila kalor jenis air 4,2 J/g°C dan massa jenis larutan dianggap 1 g/cm³. Berapakah perubahan entalpi pada reaksi tersebut?

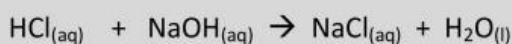


$$\begin{aligned}\text{Massa HCl} &= \text{massa jenis} \times \text{volume} \\ &= 1 \text{ g/cm}^3 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\end{aligned}$$

$$\begin{aligned}\text{Massa NaOH} &= \text{massa jenis} \times \text{volume} \\ &= 1 \text{ g/cm}^3 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}\end{aligned}$$

$$\text{Massa campuran} = \underline{\hspace{2cm}}$$

$$\begin{aligned}q_{\text{reaksi}} &= m \times c \times \Delta T \\ &= \underline{\hspace{1cm}} \times 4,2 \text{ J/g}^\circ\text{K} \times \underline{\hspace{1cm}} = \underline{\hspace{2cm}}\end{aligned}$$



mula-mula : mol mol

bereaksi : mol mol mol mol

setimbang : mol mol mol mol

$$\Delta H = \frac{q}{\text{mol}}$$

$$\Delta H = \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ kJ}$$

2. 50 mL larutan perak nitrat (AgNO_3) 0,2 M dicampur dengan 50 mL larutan NaCl 0,2 M, masing-masing bersuhu mula-mula sama yaitu 27°C . Setelah dicampur ke dalam kalorimeter suhu menjadi 31°C . Jika kalor jenis larutan = $4,2 \text{ J.g}^{-1}.\text{K}^{-1}$, massa jenis air = 1 g.cm^{-3} . Tentukanlah besarnya ΔH pada reaksi:



Massa AgNO_3 = massa jenis $\times$ volume

$$= 1 \text{ g/cm}^3 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

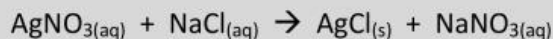
Massa NaCl = massa jenis $\times$ volume

$$= 1 \text{ g/cm}^3 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Massa campuran = $\underline{\hspace{2cm}}$

$$q_{\text{reaksi}} = m \times c \times \Delta T$$

$$= \underline{\hspace{2cm}} \times 4,2 \text{ J/g}^\circ\text{K} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$



mula-mula : $\underline{\hspace{1cm}}$ mol $\underline{\hspace{1cm}}$ mol

bereaksi : $\underline{\hspace{1cm}}$ mol $\underline{\hspace{1cm}}$ mol $\underline{\hspace{1cm}}$ mol $\underline{\hspace{1cm}}$ mol

setimbang : $\underline{\hspace{1cm}}$ mol $\underline{\hspace{1cm}}$ mol $\underline{\hspace{1cm}}$ mol $\underline{\hspace{1cm}}$ mol

$$\Delta H = \frac{q}{\text{mol}}$$

$$\Delta H = \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ kJ}$$

3. Jika pada 50 mL larutan CuSO_4 0,4 M ditambahkan serbuk zink berlebihan, maka suhu akan naik 20°C . Dengan menganggap kalor jenis larutan sama dengan kalor jenis air = $4,2 \text{ J.g}^{-1}.\text{K}^{-1}$, dan kalor wadah reaksi diabaikan, maka besarnya ΔH untuk reaksi $\text{Zn}_{(\text{s})} + \text{CuSO}_{4(\text{aq})} \rightarrow \text{ZnSO}_{4(\text{aq})} + \text{Cu}_{(\text{s})}$ adalah?



$$\text{Massa CuSO}_4 = \text{massa jenis} \times \text{volume}$$

$$= 1 \text{ g/cm}^3 \times \text{_____} = \text{_____}$$

$$q_{\text{reaksi}} = m \times c \times \Delta T$$

$$= \text{_____} \times 4,2 \text{ J/g}^\circ\text{K} \times \text{_____} = \text{_____}$$



mula-mula : _____ mol _____ mol

bereaksi : _____ mol _____ mol _____ mol _____ mol

setimbang : _____ mol _____ mol _____ mol _____ mol

$$\Delta H = \frac{q}{\text{mol}}$$

$$\Delta H = \text{_____} = \text{_____ kJ}$$

4. Pada pelarutan 5 gram kristal NaOH (Massa molar NaOH = 40 g/mol) dalam 50 mL air terjadi kenaikan suhu dari 26°C menjadi 34°C. Jika kalor jenis larutan dianggap sama dengan kalor jenis air = 4,2 J.g⁻¹.K⁻¹ dan kalor wadah diabaikan, maka entalpi pelarutan NaOH adalah?

$$\text{Massa air} = \text{massa jenis} \times \text{volume}$$

$$= 1 \text{ g/cm}^3 \times \text{_____} = \text{_____}$$

$$\text{Massa NaOH} = \text{_____}$$

$$\text{Massa campuran} = \text{_____}$$

$$q_{\text{reaksi}} = m \times c \times \Delta T$$

$$= \text{_____} \times 4,2 \text{ J/g}^\circ\text{K} \times \text{_____} = \text{_____}$$



$$\text{Mol NaOH} = \frac{\text{Massa}}{\text{Massa molar}} = \frac{\quad}{\quad} = \quad \text{mol}$$

$$\Delta H = \frac{q}{\text{mol}}$$

$$\Delta H = \frac{\quad}{\quad} = \quad \text{kJ}$$

5. Di dalam suatu kalorimeter bom direaksikan 0,16 gram gas metana (CH_4) dengan oksigen berlebihan, sehingga terjadi reaksi berikut:



Ternyata terjadi kenaikan suhu sebesar $1,56^\circ\text{C}$. Diketahui kapasitas kalor kalorimeter adalah $958 \text{ J/}^\circ\text{C}$, massa air di dalam kalorimeter adalah 1.000 gram dan kalor jenis air $4,18 \text{ J/g}^\circ\text{C}$. Tentukanlah kalor pembakaran gas metana dalam kJ/mol! (Massa molar $\text{CH}_4 = 16 \text{ g/mol}$)

$$\begin{aligned} q_{\text{kalorimeter}} &= C \times \Delta T \\ &= \quad \times \quad = \quad \end{aligned}$$

$$\begin{aligned} q_{\text{larutan}} &= m \times c \times \Delta T \\ &= \quad \times 4,2 \text{ J/g}^\circ\text{K} \times \quad = \quad \end{aligned}$$

$$q_{\text{reaksi}} = -(q_{\text{kalorimeter}} + q_{\text{larutan}}) = \quad$$

$$\text{Mol CH}_4 = \frac{\text{Massa}}{\text{Massa molar}} = \frac{\quad}{\quad} = \quad \text{mol}$$

$$\Delta H = \frac{q}{\text{mol}}$$

$$\Delta H = \frac{\quad}{\quad} = \quad \text{kJ}$$

