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Relative and Adjusted Retention and Phase Formulas

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List of 13 Relative and Adjusted Retention and Phase Formulas

Relative and Adjusted Retention and Phase

1) Adjusted Retention of First Component given Relative Retention

Open Calculator

fx $$trC1' = \left(\frac{tr2'}{\alpha}\right)$$

ex $$1.111111s = \left(\frac{10s}{9}\right)$$

2) Adjusted Retention of Second Component given Relative Retention

Open Calculator

fx $$trC2' = (\alpha \cdot tr1')$$

ex $$45s = (9 \cdot 5s)$$

3) Mobile Phase Travel Time given Capacity Factor

Open Calculator

fx $$t_{CP} = \frac{t_r}{k' + 1}$$

ex $$3.25s = \frac{13s}{3+1}$$

4) Mobile Phase Travel Time through Column

Open Calculator

fx $t_C = \left(t_r - tr'\right)$

ex $11s = (13s - 2s)$

5) Molar Concentration of Third Component in First Phase

Open Calculator

fx $C_{P1} = \left(\left(k_{DC}'\right) \cdot C_{s2}\right)$

ex $273mol/L = (10.5 \cdot 26mol/L)$

6) Molar Concentration of Third Component in Second Phase

Open Calculator

fx $C_{P2} = \left(\frac{C_1}{k_{DC}'}\right)$

ex $1.904762mol/L = \left(\frac{20mol/L}{10.5}\right)$

7) Partition Coefficient of Solute 1 given Relative Retention

Open Calculator

fx $K_{C1} = \left(\frac{K_2}{\alpha}\right)$

ex $1.666667 = \left(\frac{15}{9}\right)$

8) Partition Coefficient of Solute 2 given Relative Retention

Open Calculator

fx $K_{C2} = (\alpha \cdot K_1)$

ex $54 = (9 \cdot 6)$

9) Relative Retention given Adjusted Retention Times

Open Calculator

fx $\alpha_R = \left(\frac{tr2'}{tr1'}\right)$

ex $2 = \left(\frac{10s}{5s}\right)$

10) Relative Retention given Capacity Factor of Two Components

Open Calculator

fx $\alpha_R = \left(\frac{k2'}{k1'}\right)$

ex $1.4 = \left(\frac{3.5}{2.5}\right)$

11) Relative Retention given Partition Coefficient of Two Components

Open Calculator

fx $\alpha_R = \left(\frac{K_2}{K_1}\right)$

ex $2.5 = \left(\frac{15}{6}\right)$

12) Total Concentration of Solute in Aqueous Phase

Open Calculator

fx $$C_{aqP} = \left(\frac{C_o}{D}\right)$$

ex $$83.33333\text{mol/L} = \left(\frac{50\text{mol/L}}{0.6}\right)$$

13) Total Concentration of Solute in Organic Phase

Open Calculator

fx $$C_{orgP} = (D \cdot C_{aq})$$

ex $$24\text{mol/L} = (0.6 \cdot 40\text{mol/L})$$

Variables Used

- C_1 Concentration of Solute in Solvent 1 *(Mole per Liter)*
- C_{aq} Concentration in Aqueous Phase *(Mole per Liter)*
- C_{aqP} Concentration in Aqueous Solvent *(Mole per Liter)*
- C_o Concentration in Organic Phase *(Mole per Liter)*
- C_{orgP} Concentration in Organic Solvent *(Mole per Liter)*
- C_{P1} Concentration of Solute in Phase1 *(Mole per Liter)*
- C_{P2} Concentration of Solute in Phase2 *(Mole per Liter)*
- C_{s2} Solute Concentration in Solvent2 *(Mole per Liter)*
- **D** Distribution Ratio
- K_1 Partition Coefficient of Solute 1
- K_2 Partition Coefficient of Solute 2
- K_{C1} Partition Coefficient of Comp 1
- K_{C2} Partition Coefficient of Comp 2
- k_{DC}' Distribution Coefficient of Solution
- k' Capacity Factor
- $k1'$ Capacity Factor of Solute 1
- $k2'$ Capacity Factor of Solute 2
- t_C Unretained Solute Travel Time through Column *(Second)*
- t_{CP} Unretained Solute Travel Time given CP *(Second)*
- t_r Retention Time *(Second)*

- **tr'** Adjusted Retention Time *(Second)*
- **$tr1'$** Adjusted Retention Time of Solute 1 *(Second)*
- **$tr2'$** Adjusted Retention Time of Solute 2 *(Second)*
- **$trC1'$** Adjusted Retention Time of Comp 1 *(Second)*
- **$trC2'$** Adjusted Retention Time of Comp 2 *(Second)*
- **α** Relative Retention
- **α_R** Actual Relative Retention

Constants, Functions, Measurements used

- Measurement: **Time** in Second (s)
  Time Unit Conversion
- Measurement: **Molar Concentration** in Mole per Liter (mol/L)
  Molar Concentration Unit Conversion

Check other formula lists

- **Distribution Ratio and Length of Column Formulas**
- **Number of Theoretical Plates and Capacity Factor Formulas**
- **Important formulae on Retention and Deviation Formulas**
- **Relative and Adjusted Retention and Phase Formulas**

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10/1/2023 | 12:23:18 PM UTC

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