Chemistry Reference Page

Formulas, Constants, and Unit Conversions

Formulas

Change in Enthalpy (Heat): $Q = m(\triangle T)c_p$

Heat of Fusion: $Q = m\triangle H_{fus}$

Ideal Gas Law: $PV = nRT$

Heat of Vaporization: $Q = m\triangle H_{vap}$

Density: $d = \frac{m}{V}$

Molarity (M) = $\frac{\text{mol of solute}}{\text{L of solution}}$

Combined Gas Law: $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

Molality (m) = $\frac{\text{mol of solute}}{\text{kg of solvent}}$

Boiling Point Elevation: $\triangle T_b = k_b \times m$

Freezing Point Depression: $\triangle T_f = k_f \times m$

Constants

Universal Gas Constant (R): $0.0821 \frac{\text{atm} \times \text{L}}{\text{mol} \times \text{K}}$, or equal to $8.31 \frac{\text{kPa} \times \text{L}}{\text{mol} \times \text{K}}$

Molar Volume at STP: $22.4 \frac{\text{L}}{\text{mol}}$

Avogadro's Number (1 mole): 6.02×10^{23}

Specific Heat Capacity of Liquid Water: c_p (H_2O) = $1.00 \frac{\text{cal}}{\text{g} \times °\text{C}}$ = $4.18 \frac{\text{J}}{\text{g} \times °\text{C}}$

Unit Conversions

1 atm = 760 mm Hg = 760 Torr = 101.3 kPa = $14.7 \frac{\text{lb}}{\text{in.}^2}$ = 29.92 in. Hg

K = °C + 273

1.000 calorie = 4.184 Joules

1 mL = 1 cm^3

1 L = 1,000 mL = 1,000 cm^3

giga (G) = 10^9, mega (M) = 10^6, kilo (k) = 10^3, hecto (h) = 10^2, deka (da) = 10^1

deci (d) = 10^{-1}, centi (c) = 10^{-2}, milli (m) = 10^{-3}, micro (μ) = 10^{-6}, nano (n) = 10^{-9}

Common Ions

Element Name	Charges	Ions	Charges	Ions	Charges
Silver (Ag^{1+})	1+	Ammonium (NH_4^+)	1+	Oxide (O^{2-})	2–
Zinc (Zn^{2+})	2+	Nitrate (NO_3^-)	1–	Sulfide (S^{2-})	2–
Scandium (Sc^{3+})	3+	Nitrite (NO_2^-)	1–	Sulfate (SO_4^{2-})	2–
Copper (Cu^{1+}, Cu^{2+})	1+, 2+	Hydrogen Carbonate (HCO_3^-)	1–	Sulfite (SO_3^{2-})	2–
Gold (Au^{1+}, Au^{3+})	1+, 3+	Perchlorate (ClO_4^-)	1–	Carbonate (CO_3^{2-})	2–
Cobalt (Co^{2+}, Co^{3+})	2+, 3+	Chlorate (ClO_3^-)	1–	Peroxide (O_2^{2-})	2–
Nickel (Ni^{2+}, Ni^{3+})	2+, 3+	Chlorite (ClO_2^-)	1–	Chromate (CrO_4^{2-})	2–
Lead (Pb^{2+}, Pb^{4+})	2+, 4+	Hypochlorite (ClO^-)	1–	Dichromate ($Cr_2O_7^{2-}$)	2–
Tin (Sn^{2+}, Sn^{4+})	2+, 4+			Phosphate (PO_4^{3-})	3–
Mercury (Hg^{1+}, Hg^{2+})	1+, 2+				
Iron (Fe^{2+}, Fe^{3+})	2+, 3+				
Titanium (Ti^{2+}, Ti^{3+}, Ti^{4+})	2+, 3+, 4+				
Chromium (Cr^{2+}, Cr^{3+})	2+, 3+				
Vanadium (V^{2+}, V^{3+}, V^{4+})	2+, 3+, 4+				
Manganese (Mn^{2+}, Mn^{3+}, Mn^{4+})	2+, 3+, 4+				

Turn over for Periodic Table of the Elements