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HEAT OF SOLUTION DATA FOR AQUEOUS SOLUTIONS

Some heats of solutions and heats of hydration for dilute solutions in pure water at 15 °C.

Solute	Products	Heat of solution
<u>EXOTHERMIC</u>		
CH ₂ O ₂ (l) (methanoic acid)	H ⁺ (aq)+CHO ₂ ⁻ (aq)	-0.86 kJ/mol
C ₂ H ₄ O ₂ (l) (acetic acid)	H ⁺ (aq)+C ₂ H ₃ O ₂ ⁻ (aq)	-1.5 kJ/mol
CH ₄ O(l) (methanol)	CH ₄ O(aq)	-0.2 kJ/mol
CaCl ₂ (s)	Ca ²⁺ (aq) + 2Cl ⁻ (aq)	-82.9 kJ/mol
CaCl ₂ (s)	CaCl ₂ ·2H ₂ O(aq)	-240 kJ/kg
Ca(OH) ₂ (s)	Ca ²⁺ (aq) + 2OH ⁻ (aq)	-16.2 kJ/kg
CO ₂ (g)	CO ₂ (aq)	-19.4 kJ/mol
H ₂ O ₂ (l)	H ₂ O ₂ (aq)	-3.5 kJ/mol
H ₂ O(l)	H ⁺ (aq)+OH ⁻ (aq)	-58 kJ/mol
H ₂ SO ₄ (l)	2H ⁺ (aq)+ SO ₄ ²⁻ (aq)	-96.2 kJ/mol
MgSO ₄ (s)	Mg ²⁺ (aq)+ SO ₄ ²⁻ (aq)	-91.2 kJ/mol
HCl(g)	H ⁺ (aq)+Cl ⁻ (aq)	-74.8 kJ/mol
HClO ₄ (l)	H ⁺ (aq)+ClO ₄ ⁻ (aq)	-88.8 kJ/mol
HNO ₃ (l)	H ⁺ (aq)+NO ₃ ⁻ (aq)	-33.3 kJ/mol
KOH(s)	K ⁺ (aq)+OH ⁻ (aq)	-56 kJ/mol
LiBr(s)	Li ⁺ (aq)+Br ⁻ (aq)	-49 kJ/mol
LiBr·H ₂ O(s)	Li ⁺ (aq)+Br ⁻ (aq)	-23 kJ/mol
LiBr·2H ₂ O(s)	Li ⁺ (aq)+Br ⁻ (aq)	-9 kJ/mol
LiCl(s)	Li ⁺ (aq)+Cl ⁻ (aq)	-37 kJ/mol
LiOH(s)	Li ⁺ (aq)+OH ⁻ (aq)	-23.6 kJ/mol
NaOH(s)	Na ⁺ (aq)+OH ⁻ (aq)	-44.3 kJ/mol
NH ₃ (g)	NH ₃ (aq)	-30.5 kJ/mol
O ₂ (g)	O ₂ (aq)	-11.7 kJ/mol
SO ₂ (g)	SO ₂ (aq)	-39.5 kJ/mol
<u>ENDOTHERMIC</u>		
C ₁₂ H ₂₂ O ₁₁ (s) (sugar)	C ₁₂ H ₂₂ O ₁₁ (aq)	5.4 kJ/mol
C ₆ H ₁₂ O ₆ (s) (glucose)	C ₆ H ₁₂ O ₆ (aq)	11 kJ/mol
C ₆ H ₁₂ O ₆ ·H ₂ O(s) (glucose monohydrate)	C ₆ H ₁₂ O ₆ ·H ₂ O(aq)	19 kJ/mol
CO(NH ₂) ₂ (s) (urea)	CO(NH ₂) ₂ (aq)	15 kJ/mol
KBr(s)	K ⁺ (aq)+Br ⁻ (aq)	20 kJ/mol
KCl(s)	K ⁺ (aq)+Cl ⁻ (aq)	17 kJ/mol
KClO ₃ (s)	K ⁺ (aq)+ClO ₃ ⁻ (aq)	42 kJ/mol
KMnO ₄ (s)	K ⁺ (aq)+ MnO ₄ ⁻ (aq)	44 kJ/mol
KNO ₃ (s)	K ⁺ (aq)+NO ₃ ⁻ (aq)	35 kJ/mol
NaC ₂ H ₃ O ₂ ·3H ₂ O(s)	NaC ₂ H ₃ O ₂ ·3H ₂ O(aq)	150 kJ/kg
NaCl(s)	Na ⁺ (aq)+Cl ⁻ (aq)	3.9 kJ/mol
NaHCO ₃ (s)	Na ⁺ (aq)+HCO ₃ ⁻ (aq)	16.7 kJ/mol
NaNO ₃ (s)	Na ⁺ (aq)+NO ₃ ⁻ (aq)	20.4 kJ/mol
NH ₄ Cl(s)	NH ₄ ⁺ (aq)+Cl ⁻ (aq)	14.6 kJ/mol
NH ₄ NO ₃ (s)	NH ₄ ⁺ (aq)+NO ₃ ⁻ (aq)	25.7 kJ/mol
K ₂ SO ₄ (s)	2K ⁺ (aq)+SO ₄ ²⁻ (aq)	23.8 kJ/mol

ADDITIONAL DATA. When HCl(aq) dissolves in NaOH(aq), forming Na⁺(aq)+Cl⁻(aq), 57 kJ/mol are

released (-57 kJ/mol of heat of solution).

Many other properties can be found in [Solution properties](#) for some special solutions: salt-water, sugar-water, alcohol-water, hydrogen peroxide-water, ammonia-water and carbon dioxide-water.

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