Ammonium sulfate

Other names: ammonium sulphate
Inchi: InChI=1S/H8N2O4S/c1-5-7(3,4)6-2/h1-2H4
InchiKey: KTMPTTWZBSFVPI-UHFFFAOYSA-N
Formula: H8N2O4S
SMILES: NOS(=O)(=O)ON
Mol. weight [g/mol]: 132.14
CAS: 7783-20-2

Physical Properties

Property code	Value	Unit	Source
gf	-596.52	kJ/mol	Joback Method
hf	-693.54	kJ/mol	Joback Method
hfus	2.85	kJ/mol	Phase transitions of some sulfur-containing ammonium salts
hvap	60.33	kJ/mol	Joback Method
log10ws	0.34		Crippen Method
logp	-1.988		Crippen Method
mcvol	70.650	ml/mol	McGowan Method
pc	10348.87	kPa	Joback Method
tb	437.08	K	Joback Method
tc	635.89	K	Joback Method
tf	339.30	K	Joback Method
vc	0.256	m3/kmol	Joback Method

Temperature Dependent Properties

Property code	Value	Unit	Temperature [K]	Source
cpg	144.70	J/mol×K	437.08	Joback Method
cpg	149.29	J/mol×K	470.22	Joback Method
cpg	153.87	J/mol×K	503.35	Joback Method
cpg	158.40	J/mol×K	536.49	Joback Method
cpg	162.86	J/mol×K	569.62	Joback Method
cpg	167.20	J/mol×K	602.76	Joback Method

cpg	171.40	J/mol×K	635.89	Joback Method

Sources

Liquid-liquid equilibria of aqueous systems containing alcohol and ammonium sulfate:	https://www.doi.org/10.1016/j.fluid.2011.12.023
Measurement and correlation of phase diagram data for acetone andsulfate aqueous two-phase systems at different temperatures:	https://www.doi.org/10.1016/j.tca.2013.07.002
Joback Method:	https://en.wikipedia.org/wiki/Joback_method
Phase equilibrium of the quaternary system K2SO4-MgSO4-(NH4)2SO4-H2O at 25 oC:	https://www.doi.org/10.1016/j.fluid.2015.08.019
Influence of Ions and Temperature on Aqueous Biphasic Systems Containing Ionic Liquid and Ammonium Sulfate:	https://www.doi.org/10.1021/acs.jced.9b00226
Measuring and modeling aqueous electrolyte/amino-acid solutions with ePC-SAFT:	https://www.doi.org/10.1016/j.jct.2013.08.018
Measurement and correlation of aqueous biphasic systems composed of alcohols (1-propanol/2-propanol/tert-butanol) + (NH4)2SO4 + H2O at 298 K and a textile dye partition:	https://www.doi.org/10.1016/j.fluid.2018.03.009
Densities of Univalent Cation Sulfates in Ethanol + Water Solutions:	https://www.doi.org/10.1021/je060335h
Liquid-Liquid Equilibria of the Aqueous Two-Phase Systems Composed of the N-Ethylpyridinium Tetrafluoroborate Ionic Liquid and Ammonium Sulfate/Anhydrous Sodium Carbonate/Sodium Dihydrogen Phosphate and Water at 298.15 K:	https://www.doi.org/10.1021/je301276s
Liquid-Liquid Equilibrium of Various Aqueous Two-Phase Systems: Experiment and Correlation:	https://www.doi.org/10.1021/je400453b
McGowan Method:	http://link.springer.com/article/10.1007/BF02311772
Crippen Method:	http://pubs.acs.org/doi/abs/10.1021/ci990307l
The study of phase behavior of aqueous two-phase system containing [Cnmim]BF4 (n = 2,3,4) + (NH4)2SO4 + H2O at different temperatures:	https://www.doi.org/10.1016/j.fluid.2014.09.029
Solubility Investigations in the MgSO4-Al2(SO4)3-(NH4)2SO4-H2O Quaternary System at 40 and 60 deg C:	https://www.doi.org/10.1021/acs.jced.6b00819
Phase behavior at Different Temperatures of an Aqueous Two-Phase Ionic Liquid Containing ([BPy]NO3 + Ammonium Sulfate and Sodium Sulfate + Water):	https://www.doi.org/10.1021/acs.jced.6b00844
Effect of Salt Type and Alkyl Chain Length on the Binodal Curve of an Aqueous Two-Phase System Composed of Imidazolium Ionic Liquids:	https://www.doi.org/10.1021/acs.jced.8b00188
Water Activity in Aqueous Amino Acid Solutions Containing Ammonium Sulfate at 298.2 K:	https://www.doi.org/10.1021/je401034k
Phase Equilibria of the Na+, NH4+//SO42-, NO3--H2O Quaternary System at 303.15 and 323.15 K:	https://www.doi.org/10.1021/acs.jced.7b01015
Solubility of 6-Aminopenicillanic Acid in Aqueous Salt Solutions from 273.15 K to 303.15 K:	https://www.doi.org/10.1021/je700284r
Phase Equilibrium of the MgSO4-(NH4)2SO4-H2O Ternary System Effects of Sulfuric Acid and Iron Sulfate and Its Application in Mineral Carbonation of Serpentine:	https://www.doi.org/10.1021/acs.jced.7b01113
Solid-liquid equilibria of the CO(NH2)2-MgSO4-(NH4)2SO4-H2O system at 0 oC and 25 oC:	https://www.doi.org/10.1016/j.fluid.2017.05.002
The effect of ammonium sulfate on the solubility of amino acids in water at (298.15 and 323.15) K:	https://www.doi.org/10.1016/j.jct.2008.09.019
Experimental determination of solubility and metastable zone width of ammonium dihydrogen phosphate in (NH4)2SO4 + water and NH4F + water systems and their application:	https://www.doi.org/10.1016/j.fluid.2018.04.008
Phase diagrams of the quaternary system K+, NH4+//Cl-, SO4(2-)-H2O at 298 K:	https://www.doi.org/10.1016/j.jct.2019.03.003
Thermodynamic equilibrium of the polyethylene glycol 2000 and sulphate salts solutions:	https://www.doi.org/10.1016/j.jct.2013.10.015
Refractive Indices of Sodium, Potassium, and Ammonium Sulfates in Ethanol-Water Solutions:	https://www.doi.org/10.1021/je9010129
MgF2 Solubility in MgF2 + Salt + H2O Systems (Salt = MgSO4, (NH4)2SO4, NH4Cl) at 298.15 K:	https://www.doi.org/10.1021/acs.jced.8b00772
Phase equilibria in aqueous two-phase systems containing [Bmim]BF4 and ammonium sulfate/sodium carbonate at different temperatures: Experimental and correlation:	https://www.doi.org/10.1016/j.tca.2010.01.020
Surface Tension of Glycine, Alanine, Aminobutyric Acid, Norvaline, and Norleucine in Water and in Aqueous Solutions of Strong Electrolytes at Temperatures from (293.15 to 313.15) K:	https://www.doi.org/10.1021/acs.jced.7b00433
Physicochemical Properties of Aqueous Hydroxylamine Sulfate and Aqueous (Hydroxylamine Sulfate + Ammonium Sulfate) Solutions at Different Temperatures:	https://www.doi.org/10.1021/je8008649
Phase transitions of some sulfur containing ammonium salts:	https://www.doi.org/10.1016/j.tca.2014.08.035
Viscosities of Ammonium Sulfate, Potassium Sulfate, and Aluminum Sulfate in Water and Water + N,N-Dimethylformamide Mixtures at Different Temperatures:	https://www.doi.org/10.1021/je800330d
Aqueous biphasic systems involving alkylsulfate-based ionic liquids:	https://www.doi.org/10.1016/j.jct.2011.04.024
Water in Solutions of Chaotropic and Kosmotropic Salts: A Differential Scanning Calorimetry Investigation:	https://www.doi.org/10.1021/acs.jced.9b00222
Phase Equilibria in the Aqueous Ternary System (NH4)2SO4 + Na2SO4 + H2O at T = (303.15 and 313.15) K and p = 0.1 MPa:	https://www.doi.org/10.1021/acs.jced.7b00847
Thermal Conductivity and Density of (NH4)2SO4 + H2O, NH4NO3 + H2O, and (NH4)2SO4 + NH4NO3 + H2O Solutions at T = (278.15 to 333.15) K:	https://www.doi.org/10.1021/je201390r
Solubility of alpha-glycine in water with additives at a temperature range of (293.15 - 343.15) K: Experimental data and results of thermodynamic modeling:	https://www.doi.org/10.1016/j.fluid.2016.12.003

Triggering phase disengagement of 1-alkyl-3-methylimidazolium chloride ionic liquids by using inorganic and organic salts:	https://www.doi.org/10.1016/j.jct.2015.04.004
Phase Diagrams of Ammonium Sulfate + Ethanol/1-Propanol/2-Propanol + Water Aqueous Two-Phase Systems at 298.15 K and Correlation:	https://www.doi.org/10.1021/je900504e
NIST Webbook:	http://webbook.nist.gov/cgi/cbook.cgi?ID=C7783202&Units=SI
Liquid-liquid equilibria of ionic liquid N-butylpyridiniumtetrafluoroborate and disodium hydrogen phosphate/sodium chloride/sodium sulfate/ammonium sulfate aqueous two-phase systems at T = 298.15 K: Experiment and correlation:	https://www.doi.org/10.1016/j.fluid.2014.06.013
Phase Diagrams of (NH4)2SO4-Al2(SO4)3-H2O Ternary System: Effect of Sulfuric Acid and Its Application in Recovery of Aluminum from Coal Fly Ash:	https://www.doi.org/10.1021/acs.jced.8b00740
Crippen Method:	https://www.chemeo.com/doc/models/crippen_log10ws
The effect of temperature on polyethylene glycol (4000 or 8000)-(sodium or ammonium) sulfate Aqueous Two Phase Systems:	https://www.doi.org/10.1016/j.fluid.2016.06.019
Liquid-Liquid-Solid Triple-Phase Data for Aqueous Two-Phase Systems Comprising Ethanol/1-Propanol/2-Propanol, Acetone and Salts:	https://www.doi.org/10.1021/je400364b
Measurement of Physical Properties and Correlation of the Solubility of Calcium Carbonate in Ammonium Sulfate Aqueous Solution at T = (298.15, 323.15, and 348.15) K in the Process of Preparing Calcium Carbonate Products by the Decarbonization of Gypsum:	https://www.doi.org/10.1021/acs.jced.6b00454
Solid-liquid phase equilibria of quaternary system NH4(+)//C1(-), SO4(2-), H2PO4(-)-H2O and its subsystems NH4(+)//C1(-), SO4(2-)-H2O, NH4(+)//C1(-), H2PO4(-)-H2O at 313.15 K:	https://www.doi.org/10.1016/j.jct.2017.04.010

Legend

cpg:	Ideal gas heat capacity
gf:	Standard Gibbs free energy of formation
hf:	Enthalpy of formation at standard conditions
hfus:	Enthalpy of fusion at standard conditions
hvap:	Enthalpy of vaporization at standard conditions
log10ws:	Log10 of Water solubility in mol/l
logp:	Octanol/Water partition coefficient
mcvol:	McGowan's characteristic volume
pc:	Critical Pressure
tb:	Normal Boiling Point Temperature
tc:	Critical Temperature
tf:	Normal melting (fusion) point
vc:	Critical Volume