I'm not a robot



Masa molecular na

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This article is about the chemical element. For the nutrient commonly called sodium, see salt. For the use of sodium as a medication, see Saline (medicine). For other uses, see Natrium (disambiguation). Chemical element with atomic number 11
(Na)Sodium, 11NaSodiumAppearancesilvery white metallicStandard atomic weight Ar°(Na)22.98976928±0.00000002[1]22.990±0.001 (abridged)[2] Sodium in the periodic table Hydrogen Helium Lithium Beryllium Boron Carbon Nitrogen Oxygen Fluorine Neon Sodium Magnesium Aluminium Silicon Phosphorus Sulfur Chlorine Argon Potassium
Calcium Scandium Titanium Vanadium Chromium Manganese Iron Cobalt Nickel Copper Zinc Gallium Germanium Arsenic Selenium Bromine Krypton Rubidium Silver Cadmium Indium Tin Antimony Tellurium Iodine Xenon Caesium Barium Lanthanum
Cerium Praseodymium Neodymium Promethium Samarium Europium Gadolinium Terbium Uranium 
Neptunium Plutonium Americium Curium Berkelium Colifornium Einsteinium Fermium Mendelevium Nobelium Lawrencium Rutherfordium Dubnium Fermium Mendelevium Nobelium Lawrencium Copernicium Nihonium Flerovium Moscovium Livermorium Tennessine Oganesson Li↑Na↓K neon ← sodium → magnesium
Atomic number (Z)11Groupgroup 1: hydrogen and alkali metalsPeriodperiod 3Block s-blockElectron configuration[Ne] 3s1Electrons per shell2, 8, 1Physical propertiesPhase at STPsolidMelting point370.944 K (97.794 °C, 208.029 °F) Boiling point1156.090 K (882.940 °C, 1621.292 °F) Density (at 20° C)0.9688 g/cm3[3]when liquid
(at m.p.)0.927 g/cm3 Critical point2573 K, 35 MPa (extrapolated)Heat of fusion2.60 kJ/mol Heat of vaporization97.42 kJ/mol Molar heat capacity28.230 J/(mol·K) Vapor pressure P (Pa) 1 10 100 1 k 10 k 10 k at T (K) 554 617 697 802 946 1153 Atomic propertiesOxidation statescommon: +1 -1,[4]ElectronegativityPauling scale: 0.93 Ionization
energies1st: 495.8 kJ/mol 2nd: 4562 kJ/mol 2nd: 4562 kJ/mol 3rd: 6910.3 kJ/mol (more) Atomic radiusempirical: 186 pm Covalent radius166±9 pm Van der Waals radius227 pm Spectral lines of sodiumOther propertiesNatural occurrenceprimordialCrystal structure body-centered cubic (bcc) (cI2)Lattice constanta = 428.74 pm (at 20 °C)[3]Thermal
expansion69.91×10-6/K (at 20 °C)[3]Thermal conductivity142 W/(m·K) Electrical resistivity47.7 nΩ·m (at 20 °C) Magnetic ordering armagnetic [5] Molar magnetic susceptibility+16.0×10-6 cm3/mol (298 K)[6]Young's modulus3.3 GPa Bulk modulus3.3 GPa Bulk modulus3.3 GPa Bulk modulus3.3 GPa Speed of sound thin rod3200 m/s (at 20 °C) Mohs hardness0.5 Brinell
hardness0.69 MPa CAS Number7440-23-5 HistoryNamingpossibly from Arabic suda, 'headache', for soda's use as an anticephalalgicDiscovery and first isolationHumphry Davy (1807)Symbol "Na": from New Latin natrium, coined from German Natron, 'natron'Isotopes of sodiumve Main isotopes[7] Decay abundance half-life (t1/2) mode product 22Na
trace 2.6019 y β+ 22Ne 23Na 100% stable 24Na trace 14.9560 h β- 24Mg Category: Sodiumviewtalkedit | references Sodium is a chemical element; it has symbol Na (from Neo-Latin natrium) and atomic number 11. It is a soft, silvery-white, highly reactive metal. Sodium is an alkali metal, being in group 1 of the periodic table. Its only stable isotope
is 23Na. The free metal does not occur in nature and must be prepared from compounds. Sodium is the sixth most abundant element in the Earth's crust and exists in numerous minerals such as feldspars, sodalite, and halite (NaCl). Many salts of sodium are highly water-soluble: sodium ions have been leached by the action of water from the Earth's
minerals over eons, and thus sodium and chlorine are the most common dissolved elements by weight in the oceans. Sodium hydroxide. Among many other useful sodium compounds, sodium hydroxide (lye) is used in soap manufacture, and sodium chloride (edible salt) is a de-
icing agent and a nutrient for animals including humans. Sodium is an essential element for all animals and some plants. Sodium ions are the major contributor to the ECF osmotic pressure. [8] Animal cells actively pump sodium ions out of the cells by means of the sodium-potassium
pump, an enzyme complex embedded in the cell membrane, in order to maintain a roughly ten-times higher concentration of sodium ions into the cell through voltage-gated sodium channels enables transmission of a nerve impulse in a process called the action potential.
Emission spectrum for sodium, showing the D line Sodium at standard temperature and pressure is a soft silvery metal that combines with oxygen in the air, forming sodium oxides. Bulk sodium is usually stored in oil or an inert gas. Sodium metal can be easily cut with a knife. It is a good conductor of electricity and heat. The melting (98 °C) and
boiling (883 °C) points of sodium are lower than those of lithium but higher than those of the heavier alkali metals potassium, rubidium, and caesium, following periodic trends down the group.[10] These properties change dramatically at elevated pressures: at 1.5 Mbar, the color changes from silvery metallic to black; at 1.9 Mbar the material
becomes transparent with a red color; and at 3 Mbar, sodium is a clear and transparent solid. All of these high-pressure allotropes are insulators and electrides.[11] A positive flame test for sodium has a bright yellow color. In a flame test, sodium and its compounds glow yellow[12] because the excited 3s electrons of sodium emit a photon when they
fall from 3p to 3s; the wavelength of this photon corresponds to the D line at about 589.3 nm. Spin-orbit interactions involving the electron in the 3p orbital split the D line at about 589.6 nm; hyperfine structures involving both orbitals cause many more lines.[13] Main article: Isotopes of sodium Twenty isotopes of sodium are known, but
only 23Na is stable. 23Na is created in the carbon-burning process in stars by fusing two carbon atoms together; this requires temperatures above 600 megakelvins and a star of at least three solar masses. [14] Two radioactive, cosmogenic isotopes are the byproduct of cosmic ray spallation: 22Na has a half-life of 2.6 years and 24Na, a half-life of 15
hours; all other isotopes have a half-life of less than one minute.[15] Two nuclear isomers have been discovered, the longer-lived one being 24mNa with a half-life of around 20.2 milliseconds. Acute neutron radiation, as from a nuclear criticality accident, converts some of the stable 23Na in human blood to 24Na; the neutron radiation dosage of a
victim can be calculated by measuring the concentration of 24Na relative to 23Na.[16] Main article: Sodium compounds Sodium atoms have 11 electrons, one more than the stable configuration of the noble gas neon. The first and second ionization energies are 495.8 kJ/mol, respectively. As a result, sodium usually forms ionic
compounds involving the Na+ cation.[17] Metallic sodium is generally less reactive than potassium and more reactive than lithium.[18] Sodium metal is highly reducing, with the standard reduction potentials.[20] See also: Category: Sodium
compounds The structure of sodium chloride, showing octahedral coordination around Na+ and Cl- centres. This framework disintegrates when dissolved in water evaporates. Sodium compounds are of immense commercial importance, being particularly central to industries producing glass, paper, soap, and textiles
[21] The most important sodium compounds are table salt (NaCl), soda ash (Na2CO3), baking soda (NaHCO3), di- and tri-sodium phosphates, sodium thiosulfate (Na2S2O3·5H2O), and borax (Na2B4O7·10H2O).[22] In compounds, sodium is usually ionically bonded to water and anions and is viewed as a
hard Lewis acid.[23] Two equivalent images of the chemical structure of sodium stearate, a typical soap Most soaps are sodium salts of fatty acids. Sodium reacts exothermically with water. The reaction produces caustic soda
(sodium hydroxide) and flammable hydrogen gas. When burned in air, it forms primarily sodium peroxide with some sodium oxide. [24] Sodium tends to form water-soluble compounds, such as halides, sulfates, nitrates, carboxylates and carbonates. The main aqueous species are the aquo complexes [Na(H2O)n]+, where n = 4-8; with n = 6 indicated
from X-ray diffraction data and computer simulations. [25] Direct precipitation of sodium salts from aqueous solutions is rare because sodium bismuthate (NaBiO3), [26] which is insoluble in cold water and decomposes in hot water. [27] Because of the high solubility of its compounds,
sodium salts are usually isolated as solids by evaporation or by precipitation with an organic antisolvent, such as 15-crown-5 may be used as a phase-transfer catalyst. [29] Sodium content of samples is determined by atomic absorption
spectrophotometry or by potentiometry using ion-selective electrodes. [30] Like the other alkali metals, sodium dissolves in ammonia and some amines to give deeply colored solutions; evaporation of these solutions entain the coordination complex [Na(NH3)6]+, with the positive charge
counterbalanced by electrons as anions; cryptands permit the isolation of these complexes as crystalline solids. Sodium forms complexes with crown-5 has a high affinity for sodium because the cavity size of 15-crown-5 is 1.7-2.2 Å, which is enough to fit the sodium ion (1.9 Å).[32][33]
Cryptands, like crown ethers and other ionophores, also have a high affinity for the sodium ion; derivatives of the alkalide Na- are obtainable [34] by the addition of cryptands to solium ion; derivatives of the alkalide Na- are obtainable [34] by the addition of cryptands to solium ion; derivatives of the alkalide Na- are obtainable [34] by the addition of cryptands to solium ion; derivatives of the alkalide Na- are obtainable [34] by the addition of cryptands to solium ion; derivatives of the alkalide Na- are obtainable [34] by the addition of cryptands to solium ion; derivatives of the alkalide Na- are obtainable [35] main article: Organosodium chemistry The structure of the complex of sodium ion; derivatives of the alkalide Na- are obtainable [35] main article: Organosodium chemistry The structure of the complex of sodium ion; derivatives of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the complex of sodium ion; derivatives of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the complex of sodium ion; derivatives of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the complex of sodium ion; derivatives of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the complex of sodium ion; derivatives of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the complex of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the alkalide Na- are obtainable [36] main article: Organosodium chemistry The structure of the 
antibiotic monensin-A Many organosodium compounds have been prepared. Because of the high polarity of the C-Na bonds, they behave like sources of carbanions (salts with organic anions). Some well-known derivatives include sodium cyclopentadienide (NaC5H5) and trityl sodium ((C6H5)3CNa).[36] Sodium naphthalene, Na+[C10H8•]-, a strong
reducing agent, forms upon mixing Na and naphthalene in ethereal solutions.[37] Sodium forms alloys with many metals, such as potassium form KNa2 and NaK. NaK is 40-90% potassium and it is liquid at ambient temperature. It is an excellent thermal and electrical
conductor. Sodium-calcium alloys are by-products of the electrolytic products of the electrolytic products of the electrolytic products of the sodium, and the 1-2% of it dissolved in the sodium obtained from said mixtures can be precipitated by cooling to 120 °C and filtering.[38] In
a liquid state, sodium is completely miscible with lead. There are several methods to make sodium-lead alloys. One is to melt them together and another is to deposit sodium electrolytically on molten lead cathodes. NaPb3, NaPb4, Na5Pb2, and Na15Pb4 are some of the known sodium-lead alloys. Sodium also forms alloys with gold (NaAu2)
and silver (NaAg2). Group 12 metals (zinc, cadmium and mercury) are known to make alloys with sodium. NaZn13 and Na3Hg2, and N
compound of sodium with the Latin name of sodanum was used as a headache remedy. The name sodium is thought to originate from the Arabic suda, meaning headache, as the headache remedy. The name sodium carbonate or soda were well known in early times.[40] Although sodium, sometimes called soda, had long been recognized in
compounds, the metal itself was not isolated until 1807 by Sir Humphry Davy's "sodium hydroxide.[41][42] In 1809, the German physicist and chemist Ludwig Wilhelm Gilbert proposed the names Natronium for Humphry Davy's "sodium hydroxide.[41][42] In 1809, the German physicist and chemist Ludwig Wilhelm Gilbert proposed the names Natronium for Humphry Davy's "sodium" and Kalium for Davy's "potassium".[43] The chemical abbreviation for sodium was first
published in 1814 by Jöns Jakob Berzelius in his system of atomic symbols, [44][45] and is an abbreviation of the element's Neo-Latin name natrium, which refers to the Egyptian natron, [40] a natural mineral salt mainly consisting of hydrated sodium carbonate. Natron historically had several important industrial and household uses, later eclipsed by
other sodium compounds.[46] Sodium imparts an intense yellow color to flames. As early as 1860, Kirchhoff and Bunsen noted the high sensitivity of a sodium flame test, and stated in Annalen der Physik und Chemie:[47] In a corner of our 60 m3 room farthest away from the apparatus, we exploded 3 mg of sodium chlorate with milk sugar while
observing the nonluminous flame before the slit. After a while, it glowed a bright yellow and showed a strong sodium line that disappeared only after 10 minutes. From the weight of air could not contain more than 1/20 millionth weight of sodium. The
Earth's crust contains 2.27% sodium, making it the sixth most abundant element on Earth and the fourth most abundant metal, behind aluminium, iron, calcium, and magnesium and ahead of potassium. [48] Sodium's estimated oceanic abundant metal, behind aluminium, iron, calcium, and magnesium and ahead of potassium.
many minerals, some very soluble, such as halite and natron, others much less soluble, such as amphibole and zeolite. The insolubility of certain sodium minerals such as cryolite and feldspar arises from their polymeric anions, which in the case of feldspar is a polysilicate. In the universe, sodium is the 15th most abundant element with a 20,000 parts-
per-billion abundance, [50] making sodium 0.002% of the total atoms in the universe. Atomic sodium has a very strong spectral line in the yellow-orange part of the spectrum (the same line as is used in sodium-vapour street lights). This appears as an absorption line in many types of stars, including the Sun. The line was first studied in 1814 by Joseph
von Fraunhofer during his investigation of the lines in the solar spectrum, now known as the Fraunhofer named it the "D" line, although it is now known to actually be a group of closely spaced lines split by a fine and hyperfine structure.[51] The strength of the D line allows its detection in many other astronomical environments. In
stars, it is seen in any whose surfaces are cool enough for sodium to exist in atomic form (rather than ionised). This corresponds to stars of roughly F-type and cooler. Many other stars appear to have a sodium absorption line, but this is actually caused by gas in the foreground interstellar medium. The two can be distinguished via high-resolution
spectroscopy, because interstellar lines are much narrower than those broadened by stellar rotation. [52] Sodium has also been detected in numerous other bodies. Some comets have a sodium tail, [55] which was first detected in observations of
Comet Hale-Bopp in 1997.[56] Sodium has even been detected in the atmospheres of some extrasolar planets via transit spectroscopy.[57] Employed in rather specialized applications, about 100,000 tonnes of metallic sodium are produced annually.[58] by
carbothermal reduction of sodium carbonate at 1100 °C, as the first step of the Deville process for the production of aluminium by electrolysing a
molten salt bath ended the need for large quantities of sodium. A related process based on the reduction of sodium hydroxide was developed in 1886.[59] Sodium is now produced commercially through the electrolysis of molten sodium hydroxide was developed in 1886.[59] Sodium is now produced commercially through the electrolysis of molten sodium hydroxide was developed in 1886.[59] Sodium is now produced commercially through the electrolysis of molten sodium hydroxide was developed in 1886.[59] Sodium is now produced commercially through the electrolysis of molten sodium hydroxide was developed in 1886.[59] Sodium is now produced commercially through the electrolysis of molten sodium hydroxide was developed in 1886.[59] Sodium is now produced commercially through the electrolysis of molten sodium hydroxide was developed in 1886.[59] Sodium is now produced commercially through the electrolysis of molten sodium hydroxide was developed in 1886.[59] Sodium is now produced commercially through the electrolysis of molten sodium hydroxide was developed in 1886.[59] Sodium is now produced commercially through the electrolysis of molten sodium.
is mixed with calcium chloride to lower the melting point below 700 °C.[64] As calcium is less expensive than sodium, no calcium will be deposited at the cathode.[65] This method is less expensive than the previous Castner process (the electrolysis of sodium hydroxide).[66] If sodium of high purity is required, it can be distilled once or several
times. The market for sodium is volatile due to the difficulty in its storage and shipping; it must be stored under a dry inert gas atmosphere or anhydrous mineral oil to prevent the formation of a surface layer of sodium oxide or sodium oxide or sodium supplements Though metallic sodium has some important uses, the major
applications for sodium use compounds: millions of tons of sodium chloride, hydroxide, and carbonate are produced annually. Sodium chloride is extensively used for anti-icing and de-icing and de-icing
medicines have sodium added to improve their bioavailability; though potassium is the better ion in most cases, sodium is chosen for its lower price and atomic weight. [68] Sodium hydride is used as a base for various reactions (such as the aldol reaction) in organic chemistry. Metallic sodium is used mainly for the production of sodium borohydride,
sodium azide, indigo, and triphenylphosphine. A once-common use was the making of tetraethyllead and titanium metal; because of the move away from TEL and new titanium production of sodium declined after 1970.[58] Sodium is also used as an alloying metal, an anti-scaling agent, [69] and as a reducing agent for metals
when other materials are ineffective. Note the free element is not used as a scaling agent, ions in the water are exchanged for sodium ions. Sodium plasma ("vapor") lamps are often used for street lighting in cities, shedding light that ranges from yellow-orange to peach as the pressure increases. [70] By itself or with potassium, sodium is a desiccant;
it gives an intense blue coloration with benzophenone when the desiccate is dry.[71] In organic synthesis, sodium is used in various reactions such as the Birch reduction, and the sodium fusion test is conducted to qualitatively analyse compounds.[72] Sodium reacts with alcohols and gives alkoxides, and when sodium is dissolved in ammonia solution
it can be used to reduce alkynes to trans-alkenes.[73][74] Lasers emitting light at the sodium D line are used to create artificial laser guide stars that assist in the adaptive optics for land-based visible-light telescopes.[75] Sodium-potassium alloy (NaK) phase diagram, showing the melting point of sodium as a function of potassium concentration. NaK
with 77% potassium is eutectic and has the lowest melting point of the NaK alloys at -12.6 °C.[76] Liquid sodium is used as a heat transfer fluid in sodium-cooled fast reactors[77] because it has the high thermal conductivity and low neutron absorption cross section required to achieve a high neutron flux in the reactor.[78] The high boiling point of
sodium allows the reactor to operate at ambient (normal) pressure, [78] but drawbacks include its opacity, which hinders visual maintenance, and its strongly reducing properties. Sodium will explode in contact with water, although it will only burn gently in air. [79] Radioactive sodium-24 may be produced by neutron bombardment during operation,
posing a slight radiation hazard; the radioactivity stops within a few days after removal from the reactor needs to be shut down frequently, sodium-potassium alloy (NaK) is used. Because NaK is a liquid at room temperature, the coolant does not solidify in the pipes.[81] The pyrophoricity of the NaK means extra precautions must be
taken to prevent and detect leaks.[82] Another heat transfer application of sodium is in poppet valves in high-performance internal combustion engines; the valve stems are partially filled with sodium is an essential mineral that regulates blood volume,
blood pressure, osmotic equilibrium and pH. The minimum physiological requirement for sodium is estimated to range from about 120 milligrams per day over the age of 10.[84] Sodium chloride, also known as 'edible salt' or 'table salt'[85] (chemical formula NaCl), is the principal source of sodium (Na) in the
diet and is used as seasoning and preservative in such commodities as pickled preserves and jerky. For Americans, most sodium are its natural occurrence in food and such food additives as monosodium glutamate (MSG), sodium nitrite, sodium saccharin, baking soda (sodium
 bicarbonate), and sodium benzoate.[87] The U.S. Institute of Medicine set its tolerable upper intake level for sodium at 2.3 grams per day.[89] The American Heart Association recommends no more than 1.5 g of sodium per day.[90] The Committee to Review the Dietary
Reference Intakes for Sodium and Potassium, which is part of the National Academies of Sciences, Engineering, and Medicine, has determined that there isn't enough evidence from research studies to establish Estimated Average Requirement (EAR) and Recommended Dietary Allowance (RDA) values for sodium. As a result, the committee has
established Adequate Intake (AI) levels instead, as follows. The sodium AI for infants of 0-6 months is established at 110 mg/day; for adolescents: 9-13 years - 1,200 mg/day; for adolescents: 9-13 years 1,500 mg/day; for adolescents: 9-13 y
Sodium chloride (NaCl) contains approximately 39.34% of its total mass as elemental sodium (Na). This means that 1 gram of sodium chloride contains 1500 mg of elemental sodium (the value of 1500 mg sodium is the adequate intake (AI)
for an adult), we can use the proportion: 393.4 mg Na : 1000 mg NaCl = 1500 mg Na : x mg NaCl Solving for x gives us the amount of sodium x = (1500 mg Na × 1000 
Main article: Health effects of salt High sodium consumption is unhealthy, and can lead to alteration in the mechanical performance of the heart.[93] High sodium consumption is also associated with chronic kidney disease, high blood pressure, cardiovascular diseases, and stroke.[93] There is a strong correlation between higher sodium intake and
higher blood pressure.[94] Studies have found that lowering sodium intake by 2 g per day tends to lower systolic blood pressure by about two to four mm Hg.[95] It has been estimated that such a decrease in sodium intake would lead to 9-17% fewer cases of hypertension.[95] Hypertension causes 7.6 million premature deaths worldwide each year.
[96] Since edible salt contains about 39.3% sodium[97]—the rest being chlorine and trace chemicals; thus, 2.3 g sodium is about 5.9 g, or 5.3 ml, of salt—about one US teaspoon. [98][99] One scientific review found that people with or without hypertension who excreted less than 3 grams of sodium per day in their urine (and therefore were taking in
less than 3 g/d) had a higher risk of death, stroke, or heart attack than those excreting 4 to 5 grams per day.[100] Levels of 7 g per day or more in people with hypertension were associated with higher mortality and cardiovascular events, but this was not found to be true for people without hypertension.[100] The US FDA states that adults with
 hypertension and prehypertension should reduce daily sodium intake to 1.5 g.[99] The renin-angiotensin system regulates the amount of fluid and sodium concentration in the body. Reduction of blood pressure and sodium concentration in the kidney result in the production of renin, which in turn produces aldosterone and angiotensin, which
 stimulates the reabsorption of sodium back into the bloodstream. When the concentration of sodium increases, the production of renin decreases, and the sodium concentration returns to normal. [101] The sodium increases, and the sodium concentration returns to normal. [101] The sodium increases are the production of renin decreases, and the sodium increases.
accomplished in all animals by Na+/K+-ATPase, an active transporter pumping ions against the gradient, and sodium/potassium pump, produce electrical signals in the form of action potentials that supports cardiac muscle
contraction and promote long distance communication between neurons.[9] Sodium is the most prevalent metallic ion in extracellular fluid.[103] In humans, unusually low or high sodium levels in the blood is recognized in medicine as hyponatremia and hypernatremia. These conditions may be caused by genetic factors, ageing, or prolonged vomiting
or diarrhea.[104] In C4 plants, sodium is a micronutrient that aids metabolism, specifically in regeneration of phosphoenolpyruvate and synthesis of chlorophyll.[105] In others, it substitutes for potassium in several roles, such as maintaining turgor pressure and aiding in the opening and closing of stomata.[106] Excess sodium in the soil can limit the
uptake of water by decreasing the water potential, which may result in plant wilting; excess concentrations in the cytoplasm can lead to enzyme inhibition, which in turn causes necrosis and chlorosis.[107] In response, some plants have developed mechanisms to limit sodium uptake in the roots, to store it in cell vacuoles, and restrict salt transport
from roots to leaves.[108] Excess sodium may also be stored in old plant tissue, limiting the damage to new growth. Halophytes have adapted to be able to flourish in sodium rich environments.[108] Sodium Hazards GHS labelling: Pictograms Signal word Danger Hazard statements H260, H314 Precautionary statements P223, P231+P232, P280,
P305+P351+P338, P370+P378, P422[109] NFPA 704 (fire diamond) [110] 3 1 2W Chemical compound Sodium forms flammable hydrogen and caustic sodium hydroxide on contact with moisture on skin, eyes or mucous membranes can cause severe burns.[112][113] Sodium spontaneously explodes in the
presence of water due to the formation of hydrogen (highly explosive) and sodium hydroxide (which dissolves in the water, liberating more surface). However, sodium reaches about 290 °C, 554 °F)[114] displays a relatively mild fire. In the case of
massive (non-molten) pieces of sodium, the reaction with oxygen eventually becomes slow due to formation of a protective layer.[115] Fire extinguishers based on water accelerate sodium fires. Those based on carbon dioxide and bromochlorodifluoromethane should not be used on sodium fire.[113] Metal fires are Class D, but not all Class D
extinguishers are effective when used to extinguish sodium fires. An effective extinguishing agent for sodium fires is Met-L-X.[113] Other effective agents include Lith-X, which has graphite powder and an organophosphate flame retardant, and dry sand.[116] Sodium fires are prevented in nuclear reactors by isolating sodium from oxygen with
surrounding pipes containing inert gas.[117] Pool-type sodium fires are prevented using diverse design measures called catch pan systems. They collect leaking sodium fires are more dangerous to handle than solid sodium fires are prevented using diverse design measures called catch pan systems. They collect leaking sodium fires are prevented using diverse design measures called catch pan systems.
with the safe handling of molten sodium. In a technical report for the United States Fire Administration, [112] R. J. Gordon writes (emphasis in original) Molten sodium atom is free and mobile to instantaneously combine with any available
oxygen atom or other oxidizer, and any gaseous by-product will be created as a rapidly expanding gas bubble within the molten mass. Even a minute amount of water can create this type of reaction. Any amount of water introduced into a pool of molten sodium is likely to cause a violent explosion inside the liquid mass, releasing the hydrogen as a
rapidly expanding gas and causing the molten sodium to erupt from the combustion occurs at the surface of the liquid. An inert gas, such as nitrogen or argon, can be used to form an inert layer over the pool of burning liquid sodium, but the gas must be applied very gently and contained over
the surface. Except for soda ash, most of the powdered agents that are used to extinguish small fires in solid pieces or shallow pools will sink to the bottom of a molten mass of burning sodium - the sodium will float to the top and continue to burn. If the burning sodium is in a container, it may be feasible to extinguish the fire by placing a lid on the
container to exclude oxygen. Portal: ChemistrySodium at Wikipedia's sister projects: Definitions from Wikipedia's 
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electricity; particularly the decomposition of flame-resistant alkalis [i.e., alkalies that cannot be reduced to their base metals by flames], the preparation of new substances that constitute their [metallic] bases, and the nature of alkalies generally), Annalen der Physik, 31 (2): 113-175; see footnote p. 157. Archived 7 December 2016 at the Wayback
Machine From p. 157: "In unserer deutschen Nomenclatur würde ich die Namen Kalium und Natronium vorschlagen, wenn man nicht lieber bei den von Herrn Erman gebrauchten und von mehreren angenommenen Benennungen Kali-Metalloid and Natronium vorschlagen, wenn man nicht lieber bei den von Herrn Erman gebrauchten und von mehreren angenommenen Benennungen Kali-Metalloid and Natronium vorschlagen, wenn man nicht lieber bei den von Herrn Erman gebrauchten und von mehreren angenommenen Benennungen Kali-Metalloid and Natronium vorschlagen, wenn man nicht lieber bei den von Herrn Erman gebrauchten und von mehreren angenommenen Benennungen Kali-Metalloid and Natronium vorschlagen, wenn man nicht lieber bei den von Herrn Erman gebrauchten und von mehreren angenommenen Benennungen Kali-Metalloid and Natronium vorschlagen, wenn man nicht lieber bei den von Herrn Erman gebrauchten und von mehreren angenommenen Benennungen Kali-Metalloid and Natronium vorschlagen, wenn man nicht lieber bei den von Herrn Erman gebrauchten und von mehreren angenommenen Benennungen Kali-Metalloid and Natronium vorschlagen, wenn man nicht lieber bei den von Herrn Erman gebrauchten und von mehreren angenommenen Benennungen Kali-Metalloid and Natronium vorschlagen, wenn man nicht lieber bei den von Herrn Erman gebrauchten und von mehreren angenommen vorschlagen und von Herrn Erman gebrauchten und von Herrn Erman gebrauchten
bleiben will. Oder vielleicht findet man es noch zweckmässiger fürs Erste zwei Klassen zu machen, Metalle und Metalloide, und in die letztere Kalium und Natronium, if one would not rather continue with the appellations Kali-metalloid and Natronium zu setzen. — Gilbert." (In our German nomenclature, I would suggest the names Kalium and Natronium, if one would not rather continue with the appellations Kali-metalloid and Natronium zu setzen.
metalloid which are used by Mr. Erman and accepted by several [people], until the complete clarification of the present to create two classes, metals and metalloids, and to place Kalium and Natronium in the latter - Gilbert.) ^ J. Jacob Berzelius, Försök,
att, genom användandet af den electrokemiska theorien och de kemiska proportionerna, grundlägga ett rent vettenskapligt system för mineralogien [Attempt, by the use of electrochemical theory and chemical proportions, to found a pure scientific system för mineralogy] (Stockholm, Sweden: A. Gadelius, 1814), p. 87. ^ van der Krogt, Peter.
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Wikiquote has quotations related to Sodium. Sodium at The Periodic Table of Videos (University of Nottingham) Etymology of "natrium" - source of symbol Na The Wooden Periodic Table Table's Entry on Sodium Sodium isotopes data from The Berkeley Laboratory Isotopes Project's Retrieved from "2 15-Crown-5 Names Preferred IUPAC name
1,4,7,10,13-Pentaoxacyclopentadecane[1] Identifiers CAS Number 33100-27-5 Y 3D model (ISmol) Interactive image Beilstein Reference 1618144 ChEBI CHEBI:32401 Y ChEMBL 156289 Y ChemSpider 33416 Y ECHA InfoCard 100.046.694 EC Number 251-379-6 Gmelin Reference 3897 MeSH 15-Crown-5 PubChem CID 36336 RTECS
number SB0200000 CompTox Dashboard (EPA) DTXSID7067746 InChI =1S/C10H20O5/c1-2-12-5-6-14-9-10-15-8-7-13-4-3-11-1/h1-10H2 Ykey: VFTFKUDGYRBSAL-UHFFFAOYAH SMILES C1COCCOCCOCCOCCOC Properties
Chemical formula C10H20O5 Molar mass 220.265 g·mol-1 Appearance Clear, colorless liquid Density 1.113 g cm-3 (at 20 °C) Boiling point 93-96 °C (199-205 °F; 366-369 K) at 0.05 mmHg log P -0.639 Refractive index (nD) 1.465 Thermochemistry Std enthalpy offormation (ΔfH298) -881.1 to -877.1 kJ mol-1 Std enthalpy offormation (ΔcH298)
-5.9157 to -5.9129 MJ mol-1 Hazards GHS labelling: Pictograms Signal word Warning Hazard statements P305+P351+P338 NFPA 704 (fire diamond) 2 1 0 Flash point 113 °C (235 °F; 386 K) Safety data sheet (SDS) msds.chem.ox.ac.uk Except where otherwise noted, data are given for materials in their
standard state (at 25 °C [77 °F], 100 kPa). Y verify (what is YN?) Infobox references Chemical compound 15-Crown-5 is a crown ether with the formula (C2H4O)5. It is a cyclic pentamer of ethylene oxide that forms complex with various cations, including sodium (Na+)[2] and potassium (K+);[3] however, it is complementary to Na+ and thus has a
higher selectivity for Na+ ions. 15-Crown-5 can be synthesized using a modified Williamson ether synthesis:[4] (CH2OCH2CH2O)5 + 2 NaOH → (CH2CH2OH)2 + O(CH2CH2OH)2 + 2 NaOH → (CH2CH2OH)2 + 2 NaOH → (CH2CH2O
to sodium ions. Thus, when treated with this complexing agent, sodium salts often become soluble in organic solvents. First-row transition metal dications fit snugly inside the cavity of 15-crown-5. They are too small to be included in 18-crown-6. The binding of transition metal cations results in multiple hydrogen-bonded interactions from both
equatorial and axial agua ligands, such that highly crystalline solid-state supramolecular polymers can be isolated in this form include Co(ClO4)2, Ni(ClO4)2, and Zn(ClO4)2, Seven coordinate species are most common for transition metal complexes of 15-crown-5, with the crown ether occupying the equatorial plane,
along with 2 axial agua ligands. [6] The structure of the complex [Co(15-crown-5)(H2O)2]2+. 15-crown-5 has also been used to isolate salts of oxonium ions. For example, from a solution of tetrachloroauric acid, the oxonium ions. For example, from a solution of tetrachloroauric acid, the oxonium ions.
structure, which shows a chain of water with remarkably long O-H bond (1.12 Å) in the acidic proton, but with a very short OH•••O distance (1.32 Å).[6] Structure of [(H7O3)(15-crown-5)2]+ ion A derivative of 15-crown-5)2]+ salts:[6]
(Ar2N)3MoCH + KCH2Ph + 2 (15-crown-5) \rightarrow [K(15-crown-5)2] + [(Ar2N)3MoC] - + CH3Ph Host guest chemistry Phase transfer catalyst ^ "15-crown-5] + [(Ar2N)3MoC] - Compound Summary". PubChem Compound Summary". PubChem Compound Summary". PubChem Compound Summary".
et al. (1988). "A Conductance Study of 1:1 Complexes of 15-Crown-5, and Benzo-15-crown-5 with Alkali Metal Ions in Nonaqueous Solvents". Bulletin of the Chemical Society of Japan. 61 (3): 627-632. doi:10.1246/bcsj.61.627. ^ Chen, Chun-Yen; et al. (2006). "Potassium ion recognition by 15-crown-5 functionalized CdSe/ZnS quantum
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L.; Berkner, Joachim (2001), "15-Crown-5", Encyclopedia of Reagents for Organic Synthesis, Chichester, UK: John Wiley & Sons, Ltd, doi:10.1002/047084289x.rc263, ISBN 978-0-471-93623-7 a b c Jonathan W. Steed; Jerry L. Atwood (2009). Supramolecular Chemistry, 2nd edition. Wiley. ISBN 978-0-470-51233-3. Klok, H.A.; et al. (1997). "Novel
benzo-15-crown-5 functionalized α-olefin/CO terpolymers for membrane applications". Macromolecular Chemistry and Physics. 198 (9): 2759-2768. doi:10.1002/macp.1997.021980908. Fedorova, O.A.; et al. (2005). "Facile synthesis of novel styryl ligands containing a 15-crown-5 ether moiety". Arkivoc. xv: 12-24. doi:10.3998/ark.5550190.0006.f03.
hdl:2027/spo.5550190.0006.f03. ChemicalLand21.com www.ChemBlink.com Retrieved from " 3 15-Crown-5 Names Preferred IUPAC name 1,4,7,10,13-Pentaoxacyclopentadecane[1] Identifiers CAS Number 33100-27-5 Y 3D model (JSmol) Interactive image Beilstein Reference 1618144 ChEBI CHEBI:32401 Y ChEMBL 156289 Y ChemSpider
33416 Y ECHA InfoCard 100.046.694 EC Number 251-379-6 Gmelin Reference 3897 MeSH 15-Crown-5 PubChem CID 36336 RTECS number SB0200000 CompTox Dashboard (EPA) DTXSID7067746 InChI =1S/C10H20O5/c1-2-12-5-6-14-9-10-15-8-7-13-4-3-11-1/h1-10H2 YKey: VFTFKUDGYRBSAL-UHFFFAOYSA-N YInChI = 1/C10H20O5/c1-2-12-5-6-14-9-10-15-8-7-13-4-3-11-1/h1-10H2 YKey: VFTFKUDGYRBSAL-UHFFFAOYSA-N YINCHI = 1/C10H20O5/c1-2-12-5-6-14-9-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-4-3-11-1/h1-10-15-8-7-13-1-1/h1-10-15-8-7-13-1-1/h1-10-15-8-7-11-1/h1-10-15-8-7-11-1/h1-10-15-8-7-1-1/h1-10-15-8-7-11-1/h1-10-15-8-7-11-1/h1-10-15-8-7-11-1/h1-10-15
5-6-14-9-10-15-8-7-13-4-3-11-1/h1-10H2Key: VFTFKUDGYRBSAL-UHFFFAOYAH SMILES C1COCCOCCOCCOC Properties Chemical formula C10H2005 Molar mass 220.265 g⋅mol−1 Appearance Clear, colorless liquid Density 1.113 g cm−3 (at 20 °C) Boiling point 93-96 °C (199-205 °F; 366-369 K) at 0.05 mmHg log P −0.639 Refractive index
(nD) 1.465 Thermochemistry Std enthalpy offormation (ΔcH298) -881.1 to -877.1 kJ mol-1 Std enthalpy offormation (ΔcH298) -5.9157 to -5.9129 MJ mol-1 Hazards GHS labelling: Pictograms Signal word Warning Hazard statements H302, H315, H319 Precautionary statements P305+P351+P338 NFPA 704 (fire diamond) 2 1 0 Flash point
113 °C (235 °F; 386 K) Safety data sheet (SDS) msds.chem.ox.ac.uk Except where otherwise noted, data are given for materials in their standard state (at 25 °C [77 °F], 100 kPa). Y verify (what is YN?) Infobox references Chemical compound 15-Crown-5 is a crown ether with the formula (C2H4O)5. It is a cyclic pentamer of ethylene oxide that forms
complex with various cations, including sodium (Na+)[2] and potassium (K+);[3] however, it is complementary to Na+ and thus has a higher selectivity for Na+ ions. 15-Crown-5 can be synthesis:[4] (CH2OCH2CH2OH)2 + 2 NaOH \rightarrow (CH2CH2OH)2 + 2 NaOH 
the cyclic oligomerization of ethylene oxide in the presence of gaseous boron trifluoride.[5] Analogous to 18-crown-5. They are too small
to be included in 18-crown-6. The binding of transition metal cations results in multiple hydrogen-bonded interactions from both equatorial and axial aqua ligands, such that highly crystalline solid-state supramolecular polymers can be isolated. Metal salts isolated in this form include Co(ClO4)2, Ni(ClO4)2, Cu(ClO4)2, and Zn(ClO4)2. Seven coordinate
species are most common for transition metal complexes of 15-crown-5, with the crown ether occupying the equatorial plane, along with 2 axial aqua liquid solution of tetrachloroauric acid, the oxonium
ion [H7O3]+ has been isolated as the salt [(H7O3)(15-crown-5)2][AuCl4]. Neutron diffraction studies revealed a sandwich structure, which shows a chain of water with remarkably long O-H bond (1.12 Å) in the acidic proton, but with a very short OH•••O distance (1.32 Å).[6] Structure of [(H7O3)(15-crown-5)2]+ ion A derivative of 15-crown-5, benzo-
15-crown-5, has been used to produce anionic complexes of carbido ligands as their [K(benzo-15-crown-5)2] + salts:[6] (Ar2N)3MoC] + CH3Ph Host guest chemistry Phase transfer catalyst ^{"15-crown-5} - Compound Summary". PubChem Compound. USA: National Center for
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Steed; Jerry L. Atwood (2009). Supramolecular Chemistry, 2nd edition. Wiley. ISBN 978-0-470-51233-3. Klok, H.A.; et al. (1997). "Novel benzo-15-crown-5 functionalized α-olefin/CO terpolymers for membrane applications". Macromolecular Chemistry and Physics. 198 (9): 2759-2768. doi:10.1002/macp.1997.021980908. Fedorova, O.A.; et al. (2005).
"Facile synthesis of novel styryl ligands containing a 15-crown-5 ether moiety". Arkivoc. xv: 12-24. doi:10.3998/ark.5550190.0006.f03. hdl:2027/spo.5550190.0006.f03. ChemicalLand21.com www.ChemBlink.com Retrieved from " 4 The following pages link to 15-Crown-5 External tools (link count transclusion count sorted list) · See help page for
transcluding these entries Showing 29 items. View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)15-crown-5 (redirect page) (links | edit) Sodium compounds (links | edit) Sodium compounds (links | edit) Stability constants of complexes (links | edit) Oxy-Cope
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Template talk: Chem molar mass/articles having chembox enthalpy of formation (links | edit) View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500) Retrieved from "WhatLinksHere/15-Crown-5" SI derived unit for energy per amount of material The joule per mole (symbol: J·mol-1 or J/mol) is the unit of energy per amount of substance in the

International System of Units (SI), such that energy is measured in joules, and the amount of substance is measured in moles. It is also an SI derived unit of molar thermodynamic energy defined as the energy equal to one joule in one mole of substance. [1][2] For example, the Gibbs free energy of a compound in the area of thermochemistry is often quantified in units of kilojoules per mole (symbol: kJ·mol-1 or kJ/mol), with 1 kilojoule = 1000 joules. [3] Physical quantities measured in J·mol-1 usually describe quantities of energy transferred during phase transformations or chemical reactions. Division by the number of moles facilitates comparison between processes involving different quantities quantified in units of kilojoules per mole (symbol: kj-mol-1 or kj/mol), with 1 kilojoule = 1000 jouies, [3] Physical quantities of material and between similar processes involving different types of materials. The precise meaning of such a quantity is dependent on the context (what surban ease involving different types of materials. The precise meaning of such a quantity is dependent on the context (what surban ease involving different types of materials. The precise meaning of such a quantity is dependent on the context (what surban ease involving different types of materials. Divison by the describes meaning of such a quantity is dependent on the context (what surban ease involving different types of materials. Divison by the context of the unity of surban ease of the types of materials. The precise meaning of such a quantity is dependent on the context (what surban ease of the volume 1 is used specifically surban ease.) In the number of moise transformations or chemical reactions in the context (what surban ease involving different types of materials. The precise meaning of such a quantity is dependent on the context (what surban ease involving different types of ease involving different types of surban ease involving different types of ease involving different types of surban ease.) In the precise are involved, calculations in the context (what surban ease involving different types of surban eases.) In the precise of surban eases involving different types of surban eases.) In the precise of surban eases involving different types of surban easies in the moderal ease of the type of ease in the context (what surban eases involved, calculations is used specifically as the tipe of ease in the context is used specifically as the precise of the order of 108 kJ mol = 1 is normally used in the field of chemistry is dependent on the moderate of 100 kJ mol = 1. [5] For this reason, it is common within the field of chemistry is normally used in the field of c

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