Hexafluorosilicate salts: Human health tier II assessment

04 July 2014

Chemicals in this assessment

Chemical Name in the Inventory	CAS Number
Silicate(2-), hexafluoro-, dipotassium	16871-90-2
Silicate(2-), hexafluoro-, disodium	16893-85-9
Silicate(2-), hexafluoro-, diammonium	16919-19-0

Preface

This assessment was carried out by staff of the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) using the Inventory Multi-tiered Assessment and Prioritisation (IMAP) framework.

The IMAP framework addresses the human health and environmental impacts of previously unassessed industrial chemicals listed on the Australian Inventory of Chemical Substances (the Inventory).

The framework was developed with significant input from stakeholders and provides a more rapid, flexible and transparent approach for the assessment of chemicals listed on the Inventory.

Stage One of the implementation of this framework, which lasted four years from 1 July 2012, examined 3000 chemicals meeting characteristics identified by stakeholders as needing priority assessment. This included chemicals for which NICNAS already held exposure information, chemicals identified as a concern or for which regulatory action had been taken overseas, and chemicals detected in international studies analysing chemicals present in babies' umbilical cord blood.

Stage Two of IMAP began in July 2016. We are continuing to assess chemicals on the Inventory, including chemicals identified as a concern for which action has been taken overseas and chemicals that can be rapidly identified and assessed by using Stage One information. We are also continuing to publish information for chemicals on the Inventory that pose a low risk to human health or the environment or both. This work provides efficiencies and enables us to identify higher risk chemicals requiring assessment.

The IMAP framework is a science and risk-based model designed to align the assessment effort with the human health and environmental impacts of chemicals. It has three tiers of assessment, with the assessment effort increasing with each tier. The Tier I assessment is a high throughput approach using tabulated electronic data. The Tier II assessment is an evaluation of risk on a substance-by-substance or chemical category-by-category basis. Tier III assessments are conducted to address specific concerns that could not be resolved during the Tier II assessment.

These assessments are carried out by staff employed by the Australian Government Department of Health and the Australian Government Department of the Environment and Energy. The human health and environment risk assessments are conducted and published separately, using information available at the time, and may be undertaken at different tiers.

This chemical or group of chemicals are being assessed at Tier II because the Tier I assessment indicated that it needed further investigation.

For more detail on this program please visit:**www.nicnas.gov.au**

Disclaimer

NICNAS has made every effort to assure the quality of information available in this report. However, before relying on it for a specific purpose, users should obtain advice relevant to their particular circumstances. This report has been prepared by NICNAS using a range of sources, including information from databases

ACRONYMS & ABBREVIATIONS

Grouping Rationale

All three chemicals in this group are salts of the hexafluorosilicate ion with univalent cations of low intrinsic toxicity.

These chemicals have similar physical-chemical properties and similar uses in industrial applications. The three chemicals are expected to have similar toxicity profiles and systemic bioavailability and are therefore considered together in this assessment.

Import, Manufacture and Use

Australian

No specific Australian use, import, or manufacturing information has been identified.

International

The following international uses have been identified through European Union Registration, Evaluation, Authorisation and Restriction of Chemicals (EU REACH) dossiers; the Organisation for Economic Cooperation and Development Screening Information Dataset Initial Assessment Report (OECD SIAR); Galleria Chemica; Substances and Preparations in the Nordic countries (SPIN) database; the European Commission Cosmetic Ingredients and Substances (CosIng) database; United States (US) Personal Care Product Council International Nomenclature of Cosmetic Ingredients (INCI) dictionary; and eChemPortal: OECD High Production Volume chemical program (OECD HPV), the US Environmental Protection Agency's Aggregated Computational Toxicology Resource (ACToR), and the US National Library of Medicine's Hazardous Substances Data Bank (HSDB).

The chemicals have reported cosmetic use as:

- oral care agents (in toothpaste, mouthwash).

The chemicals have reported commercial use including:

- in laundry compounds;
- in enamels and glazes in manufacturing pottery;
- in manufacturing opalescent glass; and
- as preservatives in glue, leather and wood.

The chemicals have reported site-limited use including:

- as gelling agents in moulded latex production;
- in ore flotation;
- as additives in metallurgy (aluminium and beryllium); and
- in chemical synthesis as fluorinating agents and chemical intermediates.

The chemicals have reported non-industrial use including:

- as a component of some insecticides, rodenticides and moth repellent;
- in veterinary practice as a topical delousant and oral worming agent; and
- in fluoridating water.

Restrictions

Australian

These chemicals (as silicofluorides) are listed in the Poisons Standard (Standard for the Uniform Scheduling of Medicines and Poisons—SUSMP) in Schedules 5 and 6.

Schedule 6

Silicofluorides except:

(a) when included in Schedule 5; or

(b) in preparations containing 15 mg/kg or less of fluoride ion.

Schedule 6 chemicals are labeled with **Poison**. These are 'Substances with a moderate potential for causing harm, the extent of which can be reduced by using distinctive packaging with strong warnings and safety directions on the label'.

Schedule 5

Silicofluorides in preparations containing 3 per cent or less of fluoride ion except:

(a) barium silicofluoride when seperately specified in this Schedule; or

(b) in preparations containing 15 mg/kg or less of fluoride ion.

Schedule 5 chemicals are labelled with **Caution**. These are 'Substances with a low potential for causing harm, the extent of which can be reduced through the use of appropriate packaging with simple warnings and safety directions on the label'.

International

The chemicals are listed on the following (Galleria Chemica):

- Canada List of Prohibited and Restricted Cosmetic Ingredients (The Cosmetic Ingredient "Hotlist");
- The Association of Southeast Asian Nations (ASEAN) Cosmetic Directive Annex III—Part 1 List of substances which cosmetic products must not contain except subject to restrictions and conditions laid down;
- China Hygienic Standard for Cosmetics—Restricted Substances for use in Cosmetics (Chinese);
- EU Regulation 1223/2009 of the European Parliament and of the Council of 30 November 2009 on cosmetic products—Annex III—List of Substances which cosmetic products must not contain except subject to the restrictions laid down;
- New Zealand Cosmetic Products Group Standard—Schedule 5—Table 1: Components cosmetic products must not contain except subject to the restrictions and conditions laid down.

Under the above restrictions, the use of fluoride-containing substances is restricted to a maximum of 0.15 % fluoride concentration.

These chemicals are classified as Specially Controlled Substances in Thailand, under the *Cosmetic Act*. The maximum allowable concentration is 0.11 % (1100 ppm) calculated as active fluoride ion in toothpaste, dental floss or mouthwash.

Existing Worker Health and Safety Controls

Hazard Classification

The chemicals are classified as hazardous, with the following risk phrases for human health in the Hazardous Substances Information System (HSIS) (Safe Work Australia):

T; R23/24/25 (acute toxicity)

Exposure Standards

Australian

No specific exposure standards are available for the chemicals. However, fluorides (as F) have an exposure standard of 2.5 mg/m³ time weighted average (TWA) (Safe Work Australia).

International

The following exposure standards are identified (Galleria Chemica):

An exposure limit of 2.5 mg/m³ TWA for fluorides (as F) in different countries such as USA, Canada, Norway, Switzerland, New Zealand, China, UK and the EU.

Health Hazard Information

In water, these chemicals readily dissociate into hexafluorosilicate ions and the corresponding cation. Further dissociation of the hexafluorosilicate ion to fluoride ions and hydrated silica occurs, and is essentially complete at the pH of drinking water (6.5–8.5) (NTP, 2001). Both the monovalent cations and hydrated silica

have low toxicity. As the toxicity of the chemicals is due to the effects of the fluoride ions, toxicity data available for sodium fluoride (CAS No. 7681-49-4) are used, where data for the chemicals are lacking.

Toxicokinetics

Soluble fluoride salts are readily absorbed, increasing fluoride serum levels. Fluoride is then readily excreted in urine. Male Holtzman rats (n=10/group) were administered (by gavage) solutions of sodium fluoride (CAS No. 7681-49-4) and sodium hexafluorosilicate, both equivalent to 200 µg of fluoride. After 30 minutes, 50 % of the administered fluoride from the fluoride salts was absorbed through the gastrointestinal tract (REACHa; REACHb).

Acute Toxicity

Oral

The chemicals are classified as hazardous with the risk phrase ‘Toxic if swallowed’ (T; R25) in HSIS (Safe Work Australia). The available data support this classification.

In animal tests the chemicals have high acute toxicity following oral exposure. The median lethal dose (LD50) in rats is 156, 125 and 100 mg/kg bw for dipotassium, disodium and diammonium hexafluorosilicate, respectively (RTECS). Observed sublethal effects included lethargy, hunched posture, salivation, changes in motor activity and decreased respiratory rate.

Dermal

The chemicals are classified as hazardous with the risk phrase ‘Toxic in contact with skin’ (T; R24) in HSIS (Safe Work Australia). No dermal LD50 values are available for any of the chemicals. The lowest lethal dose (LDLo) data for sodium hexafluorosilicate support this classification.

Sodium hexafluorosilicate has very high to moderate acute toxicity in animal tests (non-guideline studies) following dermal exposure. The LDLo is 70 mg/kg bw in rats and 448 mg/kg bw in frogs (REACHa; REACHb).

No data are available for the other two chemicals in this group.

Inhalation

The chemicals are classified as hazardous with the risk phrase ‘Toxic by inhalation’ (T; R23) in HSIS (Safe Work Australia). While the available data on sodium hexafluorosilicate support a lower hazard classification (i.e. harmful if inhaled), in the absence of details of the study quality and lack of data on the other two chemicals, the existing classification is not recommended to be amended.

The median lethal concentration (LC50) for an aerosol of sodium hexafluorosilicate in rats is 1.8 mg/m³, for four hours' exposure. Observed sublethal effects included apathy, piloerection, arched back, respiratory murmurs and bloody tears (REACHa; REACHb).

No data are available for the other two chemicals in this group.

Observation in humans

The LDLo for sodium hexafluorosilicate in humans is reported to be 5.7 mg/kg bw following subcutaneous exposure (REACHa; REACHb).

In a suicide attempt, a 32-year-old woman ingested three teaspoons of sodium hexafluorosilicate, but was treated with calcium compounds (calcium carbonate and calcium lactogluconate) and recovered within 21 days. The woman experienced immediate vomiting, facial numbness, diarrhoea, sweating, muscle spasm, weakness, abdominal pain, shortness of breath, shallow breathing and cramps of the palms, feet and legs consistent with calcium deficiency. Increased heart rate and respiration were also observed (NTP, 2001).

Corrosion / Irritation

Skin Irritation

Based on the available data for sodium hexafluorosilicate, these chemicals are not considered to be skin irritants.

Sodium hexafluorosilicate produced no skin irritation in New Zealand White rabbits (OECD Test Guideline (TG) 404) (REACHa; REACHb). In the same study, two additional tests were performed (according to the *Journal Official de la Republique Francaise* and the Association Francaise de Normalisation protocols) which included application of the chemical to the abraded skin of New Zealand White rabbits. These tests produced slight irritation (Draize scores of 1.63 and 0.86 out of 8, respectively, for each protocol) with reversibility of lesions within seven days (RTECS).

No data are available for the other two chemicals in this group.

Eye Irritation

Based on the available data for sodium hexafluorosilicate, these chemicals are considered to be eye irritants, warranting hazard classification.

Sodium hexafluorosilicate was reported to severely irritate the eyes of male New Zealand White rabbits (OECD TG 405). In the same study, two additional tests were performed in male New Zealand White rabbits (according to the *Journal Official de la Republique Francaise* and the Association Francaise de Normalisation protocols). The scores indicated the chemical to be extremely irritating (acute ocular irritating index of 62.33 out of 110) (RTECS).

Sodium hexafluorosilicate produced no eye irritation in an in vitro test (OECD TG 437) (REACH).

No data are available for the other two chemicals in this group.

Sensitisation

Skin Sensitisation

No data are available for any of the chemicals in this group.

Repeated Dose Toxicity

Oral

No data are available for the chemicals. Considering the lowest observed adverse effect levels (LOAELs) available from two-year rat studies with sodium fluoride (CAS No. 7681-49-4) (4 mg/kg bw/d), and based on the treatment-related effects reported in various repeated dose toxicity studies, the chemicals are considered to cause serious damage to health from repeated oral exposure, warranting hazard classification.

In a 28-day oral gavage study (OECD TG 407) in Sprague Dawley (SD) rats, sodium fluoride at doses of 0, 2.5, 25 or 250 ppm, a no observed adverse effect concentration (NOAEC) of 25 ppm (equivalent to a no observed adverse effect level (NOAEL) of 3.75 mg/kg bw/d) was reported. Effects observed at 250 ppm included: teeth mottling and dental fluorosis; decreased blood cell volume, mean cell haemoglobin and total protein; increased alanine aminotransferase, chloride and fluoride levels; increased concentrations of potassium (males), zinc (females) and fluoride and decreased concentration of strontium in teeth; and increased concentrations of magnesium (males), sodium (males), zinc and fluoride in bones. Increased absolute stomach weight was also observed (REACHa; REACHb).

In a two-year feeding study in SD rats (n=70/sex/dose), sodium fluoride was added to a low-fluoride diet at doses of 0, 4, 10 or 25 mg/kg bw/day. A LOAEL of 4 mg/kg bw/day was reported based on dental changes. Effects observed at the highest concentration (25 mg/kg bw/day) included: fluoride toxicity changes to the teeth, bones and stomach (also seen at 10 mg/kg bw/day), decreased blood glucose, total protein and globulin levels, decreased body weight gain (30 % less compared with controls) and weight changes in the stomach and femur. Changes to the skull bones were also observed at 10 and 25 mg/kg bw/day (REACHa; REACHb).

Dermal

No data are available for any of the chemicals in this group.

Inhalation

No data are available for any of the chemicals in this group.

Observation in humans

A 23-year-old male developed skin lesions and pustules on his arms, wrists, thighs and trunk after one week of working in a foam rubber plant which used 2–3 % sodium hexafluorosilicate (NTP, 2001; RTECS).

Genotoxicity

Based on the available in vitro and in vivo genotoxicity studies with sodium hexafluorosilicate, the chemicals are not considered to be genotoxic.

Sodium hexafluorosiliciate gave negative results in several in vitro tests for gene mutation and clastogenicity (REACHa; REACHb):

- bacterial reverse mutation assay (OECD TG 471) in *Salmonella typhimurium* strains TA98, TA100, TA1535, TA1537 and TA1538 with or without metabolic activation at up to 3600 µg/plate;
- bacterial reverse mutation assay (OECD TG 471) in *Bacillus subtilis* M45 Rec- and H17 Rec+ at up to 10 M.

Sodium hexafluorosiliciate gave negative results in an in vivo gene mutation and clastogenicity test (REACHa; REACHb):

- micronucleus assay (OECD TG 474), no chromosome aberrations in bone marrow of mice and rats following intraperitoneal administration of the chemical up to 37.2 mg/kg bw.

No genotoxicity data are available for the other two chemicals.

Sodium fluoride also gave negative results in an in vitro Ames test in *S. typhimurium* and in a bone marrow micronucleus assay in the mouse and rat (in vivo) for gene mutation and clastogenicity (REACHa; REACHb).

Carcinogenicity

No data are available for the chemicals. Based on the limited available animal data for sodium fluoride and lack of genotoxicity for the chemicals and sodium fluoride, these three chemicals are not considered to be carcinogenic.

The American Conference of Governmental Industrial Hygienists (ACGIH) has listed fluorides as 'A4 not classifiable as a human carcinogen' and the IARC has concluded that 'there is inadequate evidence for carcinogenicity to humans and to animals for inorganic fluorides used in drinking water' (NTP, 2001).

In a two-year combined repeated dose and carcinogenicity oral feed study in SD rats (n=70/sex/dose), sodium fluoride at doses of 0, 4, 10 or 25 mg/kg/day was added to a low-fluoride diet, a NOAEL of 25 mg/kg bw/day was reported. No neoplastic changes were observed (REACHa; REACHb).

In a two-year, non-guideline repeated dose study in Fischer 344 rats (n=70–100/group/sex), sodium fluoride was administered in the drinking water at concentrations of 0, 25, 100 and 175 ppm (equivalent to 0, 11, 45 and 79 ppm fluoride). Osteosarcoma was observed in four rats (one at 100 ppm, 3/80 at 175 ppm). The incidence of osteosarcoma at the highest dose (3.75 %), while greater than the historical control incidence (10/2106, 0.5 %), was discounted on the basis of one set of historical controls which had a 6 % incidence (REACHa; REACHb).

Reproductive and Developmental Toxicity

No data are available for any of the chemicals in this group. Based on the information available for sodium fluoride, the chemicals are not expected to show specific reproductive or developmental toxicity.

Several reproductive toxicity studies have been conducted with sodium fluoride in rats and rabbits. The NOAECs for developmental toxicity are greater than 400 ppm (rabbit) and 175 ppm (equivalent to 26.25 mg/kg bw/d) (rat).

In a three-generation reproductivity study, rats (strain CD-CRL:CD-BR) were treated with sodium fluoride at doses of 0, 25, 100, 175 and 250 ppm (equivalent to 3.75, 15, 26.25 and 37.5 mg/kg bw/d) in drinking water for 10 weeks before mating (n=48 and n=36 for the P and F1 generations, respectively). A no observed effect level (NOEL) of 37.5 mg/kg bw/d (250 ppm) was established for reproduction. Clinical signs observed in the parents included decreased water consumption and decreased body weight gain (P males at 250 ppm). Offspring showed an increase in the development of prominent growth lines in teeth at 250 ppm (REACHa; REACHb).

In a prenatal developmental toxicity study (equivalent to EPA OPPTS 870.3700) SD rats were exposed to sodium fluoride in drinking water at doses of 0, 50, 150 or 300 ppm (equivalent to 0, 7.5, 22.5 or 45 mg/kg bw/day) during gestation days (GD) 6–15. No developmental effects were observed and a lowest observed adverse effect concentration (LOAEC) of 300 ppm was established based on decreased body weight during GD 6–8 at 300 ppm. The NOAEL is therefore 22.5 mg/kg bw/d in this study (REACHa; REACHb).

In a developmental toxicity study, New Zealand White rabbits (n=26/dose) were exposed to sodium fluoride in drinking water at doses of 0, 100, 200 or 400 ppm during GD 6–19. No developmental toxicity was observed and a LOAEC of 400 ppm was established based on decreased body weight gain (REACHa; REACHb).

In a three-generation developmental toxicity non-guideline study, rats (strain CD-CRL:CD-BR) were treated with sodium fluoride at doses of 0, 25, 100, 175 and 250 ppm (equivalent to 3.75, 15, 26.25 and 37.5 mg/kg bw/d) in drinking water for 10 weeks before mating and during gestation (females). A lowest observed effect concentration (LOEC) of 250 ppm was established for developmental toxicity based on a decreased ossification of the hyoid bone in F2 foetuses at 250 ppm. The NOAEL is therefore 22.5 mg/kg bw/d in this study. No maternal toxicity effects were observed (REACHa; REACHb).

In a non-guideline study, rats (strain CD-CRL:CD-BR, VAR+) (n=33–35/dose) were treated with sodium fluoride in drinking water at doses of 0, 10, 25, 100, 175 or 250 ppm (equivalent to 1.5, 3.75, 15, 26.25 and 37.5 mg/kg bw/d) during GD 0–20. A NOEL of 26.25 mg/kg bw/d (175 ppm) was established for maternal toxicity based on decreased body weight gain at 250 ppm. A significant increase in the average number of foetuses with three or more skeletal variations and the number of litters with foetuses with three or more skeletal variations was increased in the 250 ppm group. However, there were no dose-related increases in the incidence of soft tissue variations, external anomalies, or effects on the development of specific bones, including sternebrae (REACHa; REACHb).

Risk Characterisation

Critical Health Effects

The critical health effects for risk characterisation include systemic acute effects (acute toxicity by the oral, dermal and inhalation routes of exposure) and local effects (eye irritation). The chemicals may also cause toxic effects following repeated oral exposure.

Public Risk Characterisation

These chemicals belong to the 'Silicofluorides' entry in Schedules 5 and 6 of the SUSMP. Preparations containing 3 % or less fluoride ion are in Schedule 5, and preparations containing more than 3 % fluoride ion are in Schedule 6 of the SUSMP. Preparations containing 15 mg/kg or less fluoride ion (i.e. 0.15 % or less fluoride ion) are exempted from scheduling.

At concentrations greater than 0.15 % in cosmetics or domestic products, a number of warning statements, first aid instructions and safety directions apply.

Occupational Risk Characterisation

During product formulation, dermal, ocular and inhalation exposure of workers to these chemicals may occur, particularly where manual or open processes are used. Worker exposure to these chemicals at lower concentrations may also occur while using formulated mixtures containing the chemicals. The level and route of exposure will vary depending on the method of application and work practices employed.

Given the critical local health effects (eye irritation and acute toxicity), the chemicals may pose an unreasonable risk to workers unless adequate control measures to minimise dermal, ocular and inhalation exposure to the chemical are implemented. The chemicals should be appropriately classified and labelled to ensure that a person conducting a business or undertaking (PCBU) at a workplace (such as an employer) has adequate information to determine appropriate controls.

NICNAS Recommendation

Assessment of these chemicals is considered to be sufficient, provided that the recommended amendment to the classification is adopted, and labelling and all other requirements are met under workplace health and safety and poisons legislation as adopted by the relevant state or territory.

Regulatory Control

Public Health

Products containing these chemicals should be labelled in accordance with state and territory poisons legislation (SUSMP).

Work Health and Safety

The chemicals are recommended for classification and labelling under the current approved criteria and adopted GHS as below. This assessment does not consider classification of physical hazards and environmental hazards.

Hazard	Approved Criteria (HSIS)[a]	GHS Classification (HCIS)[b]
Acute Toxicity	Toxic if swallowed (T; R25)* Toxic in contact with skin (T; R24)* Toxic by inhalation (T; R23)*	Toxic if swallowed - Cat. 3 (H301) Toxic in contact with skin - Cat. 3 (H311) Toxic if inhaled - Cat. 3 (H331)
Irritation / Corrosivity	Irritating to eyes (Xi; R36)	Causes serious eye irritation - Cat. 2A (H319)
Repeat Dose Toxicity	Toxic: Danger of serious damage to health by prolonged exposure if swallowed (T; R48/25)	Causes damage to organs through prolonged or repeated exposure - Cat. 1 (H372)

[a] Approved Criteria for Classifying Hazardous Substances [NOHSC:1008(2004)].

[b] Globally Harmonized System of Classification and Labelling of Chemicals (GHS) United Nations, 2009. Third Edition.

[*] Existing Hazard Classification. No change recommended to this classification

Advice for consumers

Products containing these chemicals should be used according to the instruction on the label.

Advice for industry

Control measures

Control measures to minimise the risk from oral, dermal, ocular and inhalation exposure to the chemicals should be implemented in accordance with the hierarchy of controls. Approaches to minimise risk include substitution, isolation and engineering controls. Measures required to eliminate or minimise risk arising from storing, handling and using a hazardous chemical depend on the physical form and the manner in which the chemicals are used. Examples of control measures which may minimise the risk include, but are not limited to:

- using closed systems or isolating operations;
- using local exhaust ventilation to prevent the chemical from entering the breathing zone of any worker;
- minimising manual processes and work tasks through automating processes;

- work procedures that minimise splashes and spills;
- regularly cleaning equipment and work areas; and
- using protective equipment that is designed, constructed, and operated to ensure that the worker does not come into contact with the chemical.

Guidance on managing risks from hazardous chemicals are provided in the *Managing risks of hazardous chemicals in the workplace—Code of practice* available on the Safe Work Australia website.

Personal protective equipment should not solely be relied upon to control risk and should only be used when all other reasonably practicable control measures do not eliminate or sufficiently minimise risk. Guidance in selecting personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.

Obligations under workplace health and safety legislation

Information in this report should be taken into account to assist with meeting obligations under workplace health and safety legislation as adopted by the relevant state or territory. This includes, but is not limited to:

- ensuring that hazardous chemicals are correctly classified and labelled;
- ensuring that (material) safety data sheets ((m)SDS) containing accurate information about the hazards (relating to both health hazards and physicochemical (physical) hazards) of the chemical are prepared; and
- managing risks arising from storing, handling and using a hazardous chemical.

Your work health and safety regulator should be contacted for information on the work health and safety laws in your jurisdiction.

Information on how to prepare an (m)SDS and how to label containers of hazardous chemicals are provided in relevant codes of practice such as the *Preparation of safety data sheets for hazardous chemicals— Code of practice* and *Labelling of workplace hazardous chemicals—Code of practice*, respectively. These codes of practice are available from the Safe Work Australia website.

A review of the physical hazards of these chemicals has not been undertaken as part of this assessment.

References

Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)] Third edition. Accessed at **http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/258/ApprovedCriteria_Classifying_Hazardous_Substances_NOHSC1008-2004_PDF.pdf**

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REACH Dossier. Disodium hexafluorosilicate (CAS No. 16893-85-9). Accessed April 2014 at **http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances**

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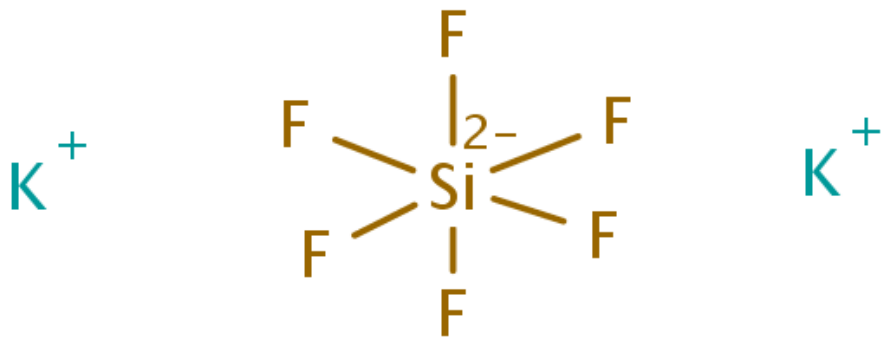
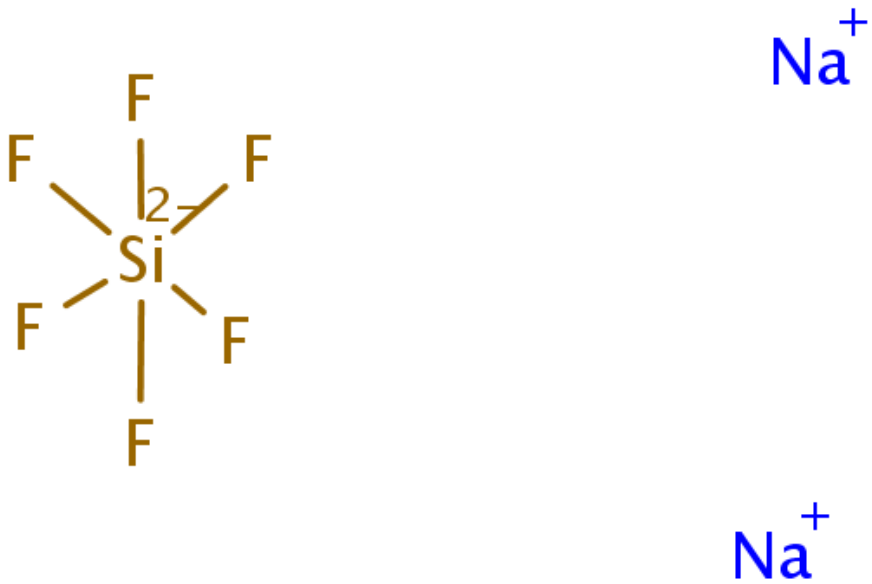
Last Update 04 July 2014

Chemical Identities

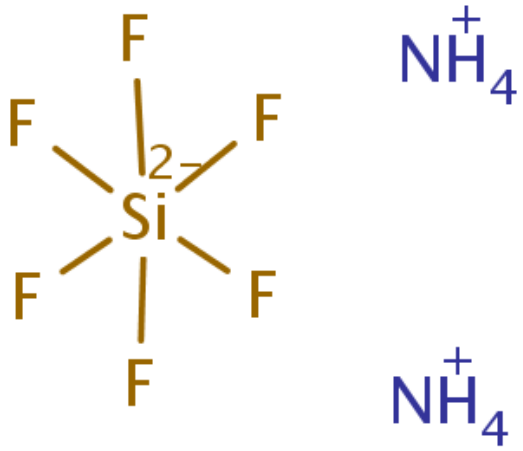
Chemical Name in the Inventory and Synonyms	**Silicate(2-), hexafluoro-, dipotassium** Potassium silicofluoride
CAS Number	16871-90-2
Structural Formula	

	
Molecular Formula	F6Si.2K
Molecular Weight	220.27

Chemical Name in the Inventory and Synonyms	**Silicate(2-), hexafluoro-, disodium** Hexafluorosilicate, disodium Sodium hexafluorosilicate Sodium silicofluoride Sodium silicon fluoride
CAS Number	16893-85-9
Structural Formula	

	
Molecular Formula	F6Si.2Na
Molecular Weight	188.05

Chemical Name in the Inventory and Synonyms	**Silicate(2-), hexafluoro-, diammonium** Ammonium hexafluorosilicate
CAS Number	16919-19-0
Structural Formula	

	
Molecular Formula	F6Si.2H4N
Molecular Weight	178.15

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