JOINT SAFETY TEAM

Safety Module

Safety Topic: Azide Compounds

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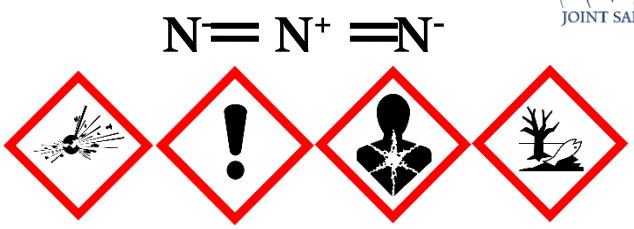
Compound **CAS#** *14343-69-2 (azide anion)*



- **Purpose –** Azides are highly toxic compounds that contain the N_3^- anion. Inorganic azides, such as sodium azide, are typically used as a preservative, biocide, or mutagen. Organics azides are useful in many different reactions, namely azide-alkyne click reactions.

- **Equipment –** Lab glasses, lab coat, nitrile gloves, plastic secondary container, and plastic spatulas or glass pipette

- **Process –**Azides are extremely toxic and symptoms of acute exposure include rapid breathing, restlessness, dizziness, weakness, headaches, nausea, vomiting, elevated heart rate, red eyes, coughing, burns, and blisters. Neither organic nor inorganic azides are very stable and even a small amount of energy applied to azides can be dangerous. Heating or impinging either organic or inorganic azides causes rapid decomposition and results in an explosion. Azides can be stored indefinitely in plastic amber containers, refrigerated (if necessary), and away from reactive materials, such as heavy metals, acids, bases, and halogenated solvents. Use plastic spatulas when handling azides to reduce impact.

- **Specific considerations –** When synthesizing an azide, make sure that your azide obeys the following equation: $\frac{(N_C+N_O)}{N_N} \geq 3$. N denotes the number of the designated atoms in the azide molecule. If the target azide contradicts this equation, take extra precaution in its purification and handling. Use extraction or precipitation methods for purifying azides; never use distillation or sublimation.

- **Waste handling –** Waste containing azides should be placed in a separate waste bottle and never added with acids and bases. Acids form toxic and volatile HN_3 when mixed with azides. Sodium azide can form explosive, insoluble compounds with heavier metals and should therefore never be poured in the drain. Azide can be quenched by diluting the azide in water to ≤ 5% with stirring, 20% sodium nitrite solution, and slowly adding 20% sulfuric acid until gas evolution has ceased.

- **For more information see –**
  - Stanford EHS: ehs.stanford.edu/reference/information-azide-compounds
  - More information on quenching here.
  - UCSB EHS: www.ehs.ucsb.edu/files/docs/ls/factsheets/Azides_FS26.pdf
  - Pittsburgh EHS: www.ehs.pitt.edu/assets/docs/SafeHandlingofAzides.pdf