

Sodium azide (NaN_3 - aka: Sodium trinitride) is a highly toxic [chemical](#) that exists as an odorless white solid. When pure, it is a white crystalline solid, odorless, and easily soluble in water. **Its solution in water is slowly hydrolyzed into a very toxic gas, [hydrogen azide](#) (HN_3). [Hydrazoic acid](#) (aka [Hydrogen azide](#)) is a colorless, volatile, and extremely explosive liquid at room temperature and pressure.**

Sodium azide is best known as the chemical found in automobile [airbags](#). An electrical charge triggered by automobile impact causes sodium azide to explode and release [nitrogen](#) gas inside the airbag. This is referred to as a decomposition reaction, since all of the energy and products originate in the original compound.

Chemical decomposition (or analysis) is the fragmentation of a [chemical compound](#) into [elements](#) or smaller compounds. It is sometimes defined as the opposite of a synthesis.

A generalized reaction formula is: $\text{AB} \rightarrow \text{A} + \text{B}$.

An example of analysis is the [electrolysis](#) of [water](#) $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$.

Another recognized form of decomposition is hydrogen peroxide. If you keep it for a long time, the hydrogen peroxide will eventually decompose into water and oxygen: $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$

With analysis and [chemical synthesis](#) equations alone it is possible to describe all types of [chemical reactions](#).

Chemical decomposition is often an undesired chemical reaction. The stability that a [chemical compound](#) ordinarily has is eventually limited when exposed to extreme environmental conditions like for instance [heat](#), [radiation](#), [humidity](#) or the [acidity](#) of a [medium](#).

The detailed decomposition process is generally not well defined and a [molecule](#) breaks up into a host of smaller fragments.

The chemical equation for the azide reaction is $2\text{NaN}_3 \rightarrow 2\text{Na} + 3\text{N}_2$ **(the gas that pressurizes the bag from the azide is N_2 (a single gas) rather than air which is approximately 79% N_2 and 21% O_2).**

NaN_3 may react with heavy metal ions such as [copper](#), [silver](#) or [lead](#) to form metal [azides](#) which are very unstable, easily synthesized, and highly explosive. Care should be taken when disposing of this material down the sink as it may react with the plumbing material.

More from me: We did an evaluation of various azide compounds at a facility I was with as sources for N_2 , to be used in a new product line. A chemist placed a mixture containing sodium azide (NaN_3) and other dry nonreactive compounds in a 2' diameter rotary mixer. After four minutes of operation the material spontaneously decomposed with flaming combustion.

My experience with azides is that they can be unstable and decomposition is subject to initiation from various energy forms including shearing of solids containing the azide during aggressive mixing, external heat, heat from internal source, static discharge and mechanical shock. Sensitivity may increase markedly when the azides are contaminated by other materials, such as residue from other reactions.

Hello Ron -

The DVD you did for State Farm is super!

Will you be at FDIC? I am doing a program Tuesday and will be there through Saturday - E-mail or page if you have the opportunity: 573-277-9911.

jbs

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