

Difference Between 1-Butyne and 2-Butyne

www.differencebetween.com

Key Difference – 1-Butyne vs 2-Butyne

All simple [aliphatic hydrocarbons](#) are broadly categorized into three types based on the presence of carbon-carbon single or multiple bonds: [alkanes](#), [alkenes](#), and [alkynes](#). Alkanes are [saturated hydrocarbons](#) and contain only single carbon-carbon bonds. The general formula of alkane is C_nH_{2n+2} . Some common alkanes include [methane](#), [ethane](#), [propane](#), and [butane](#). Alkenes are the unbranched unsaturated hydrocarbons with at least one carbon-carbon double bond. The general formula of alkene is C_nH_{2n} . The simplest alkene is [ethylene](#). Butene, hexene, propene are some common examples for alkenes. Alkynes are the unsaturated hydrocarbons with at least one carbon-carbon triple bond. The general formula of alkyne is C_nH_{2n-2} . 1-butyne and 2-butyne are two simple alkynes that contain one carbon-carbon triple bond in different places. Both has the same molecular formula of C_4H_6 , but have some differences. The key difference between 1-butyne and 2-butyne is that **in 1-butyne, the triple bond is found between first and second carbon, whereas in 2-butyne, it is found between second and third carbon atoms**. Because of this difference, these two substances have entirely different characteristic features.

What is 1-Butyne?

1-butyne is called a terminal alkyne due to the presence of terminal triple bond between the first and second carbon atoms of the carbon chain. Because of the presence of this terminal bond, 1-butyne can be distinguished from 2-butyne by two main tests. In the first test, ammoniacal cuprous chloride solution gives a red precipitate with 1-butyne, resulting in copper 1-butyne. In the second test, ammoniacal silver nitrate solution reacts with 1-butyne, resulting in silver 1-butyne, which is a white precipitate. Both these two solutions do not react with 2-butyne.

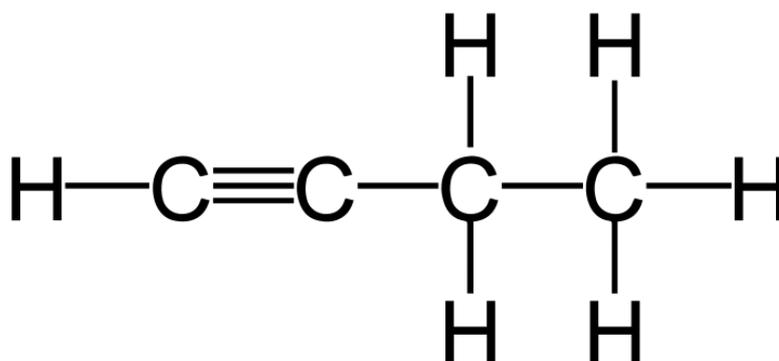


Figure 01: 1-Butyne

1-butyne is an extremely [flammable](#) colorless gas. It is denser than normal air. The IUPAC name of 1-butyne is but-1-yne.

What is 2-Butyne?

2-butyne is a non-terminal alkyne, which has its triple bond in the middle of the carbon chain, connecting the second and the third carbon atoms. Unlike terminal alkynes, 2-butyne does not react with either ammoniacal cuprous chloride solution or ammoniacal silver nitrate solution to give characteristic precipitates. The terminal alkyl groups of 2-butyne provide electrons to sp-hybridized carbon, thus stabilizing the alkyne while decreasing the heat of hydrogenation. Hence, the heat of hydrogenation is less in 2-butyne than in 1-butyne. 2-butyne is a colorless liquid and emits a [petroleum](#)-like odor. It has a lower density than water and is not soluble in water. The IUPAC name is but-2-yne.



Figure 02: 2-Butyne

What is the difference between 1-Butyne and 2-Butyne?

1-Butyne vs 2-Butyne	
1-Butyne is a terminal alkyne with a triple bond that connects first and second carbon atoms.	2-Butyne is a non-terminal alkyne with a triple bond that connects second and third carbon atoms.
Heat of Hydrogenation	
Heat of hydrogenation is 292 kJ/mol.	Heat of hydrogenation is 275 kJ/mol.
Phase	
1-Butyne is a colorless gas	2-Butyne is a colorless liquid
Stability	
1-Butyne is less stable than 2-Butyne due to the presence of terminal triple bond	2-Butyne is more stable.
With Ammoniacal Cuprous Chloride Solution	

1-Butyne gives a red precipitate of copper 1-butyride.	2-Butyne gives no such precipitate.
With Ammoniacal Silver Nitrate Solution (Tollen's Reagent)	
1-Butyne gives a white precipitate of silver acetylide	2-Butyne gives no such precipitate.
IUPAC Name	
IUPAC name is but-1-yne	IUPAC name is but-2-yne
Common Name	
Common name is ethylacetylene	Common name is Dimethylacetylene

Summary – 1-Butyne vs 2-Butyne

Both 1-butyne and 2-butyne are hydrocarbons that belong to the group of alkynes. 1-butyne is a terminal alkyne that has a triple bond connecting C1 and C2. It is a colorless gas. 2-butyne is a colorless liquid that has its triple bond connecting C2 and C3 atoms. Hence 2-butyne is a non-terminal alkyne. Due to this difference between 1-Butyne and 2-Butyne, these two hydrocarbons have entirely different chemical and physical properties. However, their chemical formula is the same, i.e., C_4H_6 .

References:

1. Carey, Francis A., and Richard J. Sundberg. Advanced Organic Chemistry Part A: Structure and Mechanisms. Boston, MA, Springer US, 2007.
2. Lon, Clive. X-Kit FET Grade 12 PHYS SCIENCE CHEMISTRY. South Africa, Pearson, 2008.
3. "1-BUTYNE." National Center for Biotechnology Information. PubChem Compound Database, U.S. National Library of Medicine, [Available here](#). Accessed 8 Sept. 2017.
4. "2-BUTYNE." National Center for Biotechnology Information. PubChem Compound Database, U.S. National Library of Medicine, [Available here](#). Accessed 8 Sept. 2017.

Image Courtesy:

1. "Ethylacetylene" By Magmar452 – Own work (CC0) via [Commons Wikimedia](#)
2. "Dimethylacetylene" By Edgar181 – Own work (Public Domain) via [Commons Wikimedia](#)

How to Cite this Article?

APA: Difference Between 1-Butyne and 2-Butyne. (2017, September 08). Retrieved (date), from <http://differencebetween.com/difference-between-1-butyne-and-vs-2-butyne/>

MLA: "Difference Between 1-Butyne and 2-Butyne" *Difference Between.Com*. 08 September 2017. Web.

Chicago: "Difference Between 1-Butyne and 2-Butyne." *Difference Between.Com*. <http://differencebetween.com/difference-between-1-butyne-and-vs-2-butyne/> accessed (accessed [date]).



Copyright © 2010-2017 Difference Between. All rights reserved