VOLUME-3, ISSUE-1

SYNTHESIS, STRUCTURE AND PROPERTIES OF BENZENE-1,4-DICARBOXYLIC ACID

Mamatqoriyev Otabek Vahobjonovich
Master's student at Termez State University
Kungrotov Inom Nazarullayevich
Master's student at Termez State University
Khamrayev Mukhiddin Farkhodovich
Master's student at Termez State University

Abstract: Benzene-1,4-dicarboxylic acid (phthalic acid) is a strong acid and an important raw material for many industrial products, widely used in plastics, paints, pharmaceuticals and many other industries. There are many methods available for its synthesis and properties, further increasing the industrial importance of this compound.

Key words: Benzene-1,4-dicarboxylic acid, phthalic acid, industry, plastics, paints, raw materials.

Phthalic acid was discovered by chemists at the beginning of the 19th century. Its detection was mainly carried out through oxidation reactions of benzene. French chemist Michel Eugène Chevreul reacted benzene with oxidizing agents in the 1820s and found the initial traces of phthalic acid. When he analyzed the new compounds formed from the oxidation of benzene, they were unique in terms of their structure and chemical properties. He also called this compound "carboxylic acid".

The name phthalic is derived from the Greek word "phthalos", which means "blue" or "yellow" colored compounds. It refers to the color properties of the compound. The chemical structure and functional groups of phthalic acid caused such reactions. At the beginning of the 19th century, a method of obtaining phthalic acid was developed by reacting benzene with oxidizing substances. Thus, the synthesis and identification of phthalic acid began, and later it was used in the chemical industry.

Phthalic acid is attached to the benzene ring (C_6H_6) in the 1,4-position of two carboxyl (CO_2H) groups. Its molecular formula is $C_6H_4(CO_2H)_2$.

The structure of phthalic acid is symmetrical, and both COOH groups are located in the 1st and 4th positions of the benzene ring.

Phthalic acid is a white or transparent crystalline substance. Phthalic acid is sparingly soluble in water, but soluble in many organic solvents (eg, ethanol, ether). It boils around 298 °C. Melts between 150-155 °C.

Phthalic acid is a strong acid that readily donates a proton (H^+) through its carboxyl groups.

Phthalic acid reacts with esters to form phthalate esters. Phthalate esters are widely used in the production of plastics and other materials.

Phthalic acid can be obtained by oxidizing benzene. In this case, benzene reacts with oxygen or other oxidizing agents to form carboxyl groups at the 1,4-positions of benzene.

$$C_6H_6+O_2 \rightarrow C_6H_4(CO_2H)_2$$

Phthalic acid can be obtained by reacting phthalic anhydride with water.

$$C_6H_4(COOH)_2 + 2H_2O \rightarrow C_6H_4(COO)_2 + 2H_3O$$

Phthalic acid is often used to produce phthalate esters, which are used to soften and make materials such as PVC (polyvinyl chloride) more elastic.

Phthalic acid is used in the production of paints and varnishes due to its structure and chemical properties.

Phthalic acid is used in some pharmaceutical and cosmetic products. For example, in the production of some medical preparations and antiseptic substances.

Phthalic acid is used as a starting material in organic synthesis. It is used in the synthesis of various other compounds, for example, phenol and anhydrides.

CONCLUSION

Benzene-1,4-dicarboxylic acid (phthalic acid) is one of the important industrial materials due to its chemical structure, synthesis and properties. It is used in the plastic industry, paint production and many other chemical processes.

LEST OF REFERENSES

1. Artikel Atom by Atom, Bond by Bond, a Chemical Reaction Caught in the Act, Pressemitteilung des Lawrence Berkeley National Laboratory, abgerufen am 13. Juni 2013.

2. „СПОСОБ В.Ф.МОЖАРОВСКОГО КОМПЛЕКСНОГО ЭТИОЛОГИЧЕСКОГО ЛЕЧЕНИЯ ПСОРИАЗА ПРОТИВОВИРУСНЫМ И ПРОТИВОМИКРОБНЫМИ ПРЕПАРАТАМИ "ЛИКВАЦИД", "ТРИНОЛ", "ТРИСОЛИД" И "ТРОТИПИД" - Патент РФ 2102072“. ru-patent.info. 2019-yil 17-dekabrda asl nusxadan arxivlangan. Qaraldi: 2019-yil 23-yanvar. (Wayback Machine saytida 2019-12-17 sanasida arxivlangan)

3. Stranks, D. R.; M. L. Heffernan; K. C. Lee Dow; P. T. McTigue; G. R. A. Withers. *Chemistry: A structural view*. Carlton, Victoria: Melbourne University Press, 1970 — 347-bet. ISBN 978-0-522-83988-3.

4. Fred Fan Zhang, Thomas van Rijnman, Ji Soo Kim, Allen Cheng „On Present Methods of Hydrogenation of Aromatic Compounds, 1945 to Present Day“ Lunds Tekniska Högskola 2008

5. *Ceresana* „Benzene - Study: Market, Analysis, Trends 2021 - Ceresana“. *www.ceresana.com*. 21-dekabr 2017-yilda asl nusxadan arxivlangan. Qaraldi: 4-may 2018-yil.