

What is Itaconic anhydride and its applications?



Vaughan

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Overview

Itaconic anhydride is also known as 2-methylenesuccinic anhydride, chemical formula $C_5H_4O_3$, the molecular weight is 112.19, the melting point is 66~70°C, and the boiling point is 114~115°C (1.6kPa). This substance appears as a white crystalline powder, easily soluble in water, alcohol, chloroform and decomposed, and slightly soluble in benzene and ether.



Preparation

Laboratory preparation: Heat and melt 200g (0.95mol) citric acid monohydrate, and place it in a distillation device for rapid distillation (to avoid overheating). The distillate contains water. and Itaconic anhydride, and then remove the layer after layering to obtain 40~50g of Itaconic anhydride product, with a yield of 37~47%.

Industrial preparation: The characteristic of this process is that the molar ratio of itaconic acid and dehydrating agent is: itaconic acid: dehydrating agent = 1:0.95~1.0; the stirring reaction is 0.5 at 45~55°C. ~6h; or react at 75~85°C for 2.5~6h. The dehydrating agent can be selected from maleic anhydride or acetic anhydride; the catalyst can be selected from zinc acetate, potassium acetate or sodium acetate. The effect achieved by this method is: a production method of Itaconic anhydride that can be applied to industrialization is obtained. The melting point of the finished product is 67~69°C and the content is ≥98% [1].

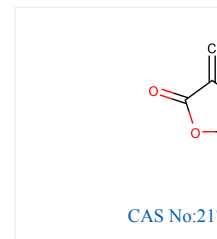
Application

Itaconic anhydride is an important itaconic acid derivative and fine chemical raw material. Because its molecule contains carbon-carbon unsaturated double bonds and anhydride base and other reactive functional groups, thus becoming an important polymerization monomer in the production of polymer materials, widely used in the production of synthetic resins, synthetic fibers, ion exchange resins, surfactants, boiler descalers, lubricating additives, adhesives, and non-toxic packaging Materials, raw materials or auxiliaries for herbicides and pesticides, etc. It can also be used as synthetic metal adhesion accelerator, synthetic resin improver, esterification agent, and anti-discoloration agent.

1) Synthetic surfactants. Using long-chain fatty alcohols and Itaconic anhydride as raw materials, sodium dodecyl itaconate (C12), sodium isomeric tridecanol itaconate (C13-iso) and sodium cetyl itaconate were synthesized through monoesterification reaction. (C16) Three reactive surfactants. The reaction conditions are: n (long chain fatty alcohol): n (Itaconic anhydride) = 1:1, temperature is 70°C, reaction time is 8 h. Under these conditions, the yields of each product were above 90%. Through infrared spectroscopy (FT-IR), hydrogen nuclear magnetic resonance spectroscopy (1H NMR) and elemental analysis, and the emulsifying power, surface activity and micellization thermodynamic properties of the product were studied. The results show that the three reactive surfactants prepared have good surface activity [2].

2) Used to synthesize grafted polylactic acid copolymer. Itaconic anhydride grafted polylactic acid copolymer. Itaconic anhydride is grafted onto the molecular chain of polylactic acid through a melt free radical grafting reaction. It is made of the following raw materials in weight percentages: 90% to 99% polylactic acid, 0.5% to 8 % Itaconic anhydride and 0.1% ~ 5% initiator. The synthesized Itaconic anhydride grafted polylactic acid copolymer is suitable for use as coupling agent. Especially in polylactic acid composite materials and polylactic acid blends, Itaconic anhydride grafted polylactic acid copolymer serves as an interfacial coupling

Itaconic anhydride



Itaconic anhydride Suppliers

Tianjin Furuntongda Tech



Fast delivery Hot sale Sell well

CAS:2170-03-8 Low price large

Update Time: Sep 20 2024

Price: 10 USD/kg

Purity: 99%

Baoji Guokang Healthche



Itaconic anhydride

Update Time: Sep 10 2024

Price: 0 USD/kg

Purity: 99%

Amitychem Corporation



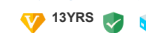
Factory Supply Itaconic anhydride

Update Time: Jun 28 2023

Price: 0.1 USD/kilogram

Purity: 99.90%

Dayang Chem (Hangzhou)



Itaconic anhydride

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Price: 2 USD/kilogram

Purity: 95%, 99%

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agent for polyester-based composite materials, greatly enhancing the adhesion at the interface and significantly improving the mechanics of the composite material. performance and has broad application prospects [3].

3) Itaconic anhydride modified collagen, and then irradiated with ultraviolet light to prepare light-curing hydrogel. Relevant experimental verification: As the degree of substitution of the itaconic acid group increases, the gelation time prolongs, the pore size of the gel becomes smaller, and the rheology and swelling properties of the gel first increase and then decrease. In addition, the antibacterial properties of the gel are related to The degree of substitution is positively correlated. The synthesized hydrogel has certain bacteriostatic properties, high swelling and mechanical strength and certain antibacterial properties, and can be used to develop wound dressings [4].

4) Pharmaceutical industry. Flurobufen is a type of anti-inflammatory drug. Methyl succinic anhydride is obtained through isomerization, reduction and cyclization of Itaconic anhydride, and 2,4 is obtained by the Gomberg-Bachmann-Hey reaction of 2,4-difluoroaniline. - Difluorobiphenyl undergoes Fu-G reaction to produce the COX/5-LO dual inhibitor flurobufen [5].

References

[1] Wang Youchang, Wang Futai, Han Junying. Industrial scale production process of Itaconic anhydride:

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[2] Wen Hongmei, Wang Yulu, Zhu Hongxia, et al. Synthesis and performance research of Itaconic anhydride reactive surfactant [J]. Leather and Chemical Industry, 2022(003):039.

[3] Wang Xiong, Li Peng, Chen Huxiao, et al. An Itaconic anhydride grafted polylactic acid copolymer and its preparation method and application. CN201711058674.7.

[4] Cheng Yulin, Li Guoying. Itaconic anhydride modification Preparation of light-curable hydrogel from natural collagen [J]. Leather Science and Engineering, 2022(004):032.

[5] Wang Weidong, Zhang Yihua. Synthesis of flurobufen [J]. China Pharmaceutical Industry Magazine, 2005, 36(3):2.DOI:10.3969/j.issn.1001-8255.2005.03.002.

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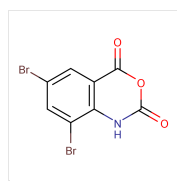
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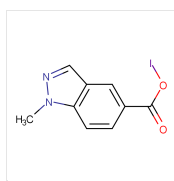
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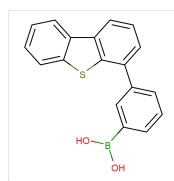
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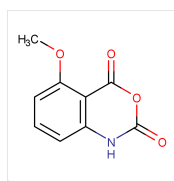
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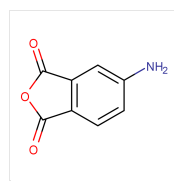
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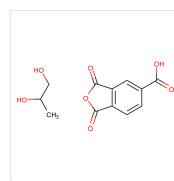
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