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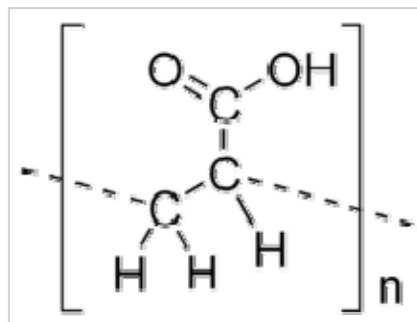
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Polyacrylic Acid

updated Jun 28, 2010 by Maria Mergel

Introduction



Poly(acrylic acid) (number 9003-polymer). The (acrylic acid) in water solution many of the side chains will lose their acidic character and become a negative charge.

Dry PAA is a white solid. It is capable of absorbing many times its weight in water, and hence is used in disposable material form a diaper.

Chemical Properties

Polyacrylic acid is a large-molecular-weight compound consisting of repeating units called monomers. The polyacrylate is formed from acrylic acid and sodium acrylate monomers. The polymer may be changed by varying the reaction length of the chains and can change the character of the polymer. It can be formed into microparticles of irregular shape that swell and absorb water, urine, or other aqueous solutions.

History

A super-absorbent (SAP) or polyacrylic acid was first developed by Carlyle Harmon of Johnson & Johnson. It was first used in 1961.

Uses

Polyacrylic acid is found in a wide variety of household products.

- Diapers
- Hand sanitizer
- Mascara

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- Aftershave
- Toothpaste
- Hair-styling products (gels, dyes, sprays)
- Moisturizer
- Pet shampoo
- Metal polish

Toxicity

Human Health Effects

Products containing polyacrylic acid warn of a mild irritation for skin contact.

Material Safety Data Sheets (MSDSs)

A common statement on MSDSs is "To the best of our knowledge, the following properties have not been thoroughly investigated"

- Fisher Scientific - MSDS CAS# 9003-01-4 -
- Chemical book CAS# 9007-20-9 - minimal irritation
- [] - indicates benzene as possible contaminant
- Poly(acrylic acid) Sodium Salt - 9003-04-7
- American Polymer Standards Corporation -

Manufacture

Note that the polyacrylic acid contains some of the following

Information from Chemquat and their website on Polyacrylic Acid

IUPAC Name: acrylic acid

CAS Number: 9003-01-4

Chemical Formula: C₃H₄O₂

Appearance: colorless to pale yellow transparent

Solid content, % 25-42

Free monomers as acrylate: 0.5% max

Molecular weight 1200-100000

pH of 1% solution: 3.0 max

Specific gravity; g/cm³: 1.15 min

Packing 200l plastic drum

Gross weight 260kg

Net weight 250kg

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Attachments

- [Polyacrylic_acid.png](#)
- [Polyacrylic.4.jpg](#)

[Phosphine](#) [Acrylic Acid](#)

Regulation

- Polyacrylic acid is regulated under the US EPCRA.
- Polyacrylic acid is monitored by the [International World Health Organization](#).
- Polyacrylic acid, sodium salt is listed as a food additive (FDA).

References

- U.S. Department of Health and Human Services
- U.S. Food and Drug Administration: [Everything You Need to Know About Polyacrylic Acid](#)
- Cool Science website: [Diapers](#) - Short introduction to the chemistry of different configurations
- University at Buffalo, the State University of New York: [Polyacrylic Acid](#) - Dated page (from 1999), but contains useful information
- University of Southern Mississippi: [Polyacrylic Acid](#) - Short introduction to the chemistry of different configurations

Labels: