Organic Syntheses

A Publication
of Reliable Methods
for the Preparation
of Organic Compounds

Working with Hazardous Chemicals

The procedures in *Organic Syntheses* are intended for use only by persons with proper training in experimental organic chemistry. All hazardous materials should be handled using the standard procedures for work with chemicals described in references such as "Prudent Practices in the Laboratory" (The National Academies Press, Washington, D.C., 2011; the full text can be accessed free of charge at http://www.nap.edu/catalog.php?record_id=12654). All chemical waste should be disposed of in accordance with local regulations. For general guidelines for the management of chemical waste, see Chapter 8 of Prudent Practices.

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These paragraphs were added in September 2014. The statements above do not supersede any specific hazard caution notes and safety instructions included in the procedure.

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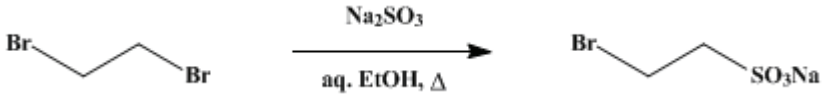
SODIUM 2-BROMOETHANESULFONATE

[Ethanesulfonic acid, 2-bromo-, sodium salt]



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1. Procedure

In a 5-l. round-bottomed flask, fitted with a reflux condenser, a mechanical stirrer, and a separatory funnel, are placed 615 g. (3.3 moles) of ethylene dibromide (Note 1), 1250 cc. of 95 per cent alcohol, and 450 cc. of water (Note 2). The stirrer is started and the mixture heated to boiling. To the well-stirred boiling mixture a solution of 125 g. (1 mole) of anhydrous sodium sulfite in 450 cc. of water is added through the separatory funnel over a period of about two hours. The solution is boiled under a reflux condenser for two hours after all the sulfite solution has been added. The condenser is then set for distillation, and the alcohol and the ethylene bromide are distilled (Note 3). The remaining water solution is poured into a large evaporating dish and evaporated to dryness on the water bath. The sodium 2-bromoethanesulfonate is extracted from the sodium bromide and unchanged sodium sulfite with 2 l. of boiling 95 per cent alcohol. On cooling the solution, most of the salt crystallizes; the mother liquor is used for a second extraction of the residue. The yield is 165–190 g. (78–90 per cent of the theoretical amount). The product (Note 4) may be further purified by recrystallizing from alcohol and drying in an oven at 110° (Note 5). The recovery on recrystallization is 75–80 per cent.

2. Notes

1. The large excess of ethylene dibromide is necessary to reduce the formation of the disulfonic acid.
2. The concentration of the alcohol seems to be important; poorer yields were obtained when it was changed in either direction.
3. By diluting the alcoholic distillate from the reaction mixture with 10 l. of water, it is possible to recover about 400 g. of ethylene dibromide.
4. This product may contain as much as 2 to 5 per cent of sodium bromide, but it is pure enough for the preparation of taurine (p. 563). A very pure product can be obtained by a second crystallization from alcohol.
5. The salt is slightly hygroscopic.

3. Discussion

The directions given in the procedure are based on those of Kohler.[1] Sodium 2-bromoethanesulfonate has also been prepared by treating ethylene oxide with sodium bisulfite and converting the isethionic acid thus obtained to the bromo acid with hydrobromic acid.[2]

This preparation is referenced from:

- Org. Syn. Coll. Vol. 2, 563

References and Notes

1. Kohler, Am. Chem. J. **20**, 692 (1898); Marvel, Bailey, and Sparberg, J. Am. Chem. Soc. **49**, 1835 (1927).

2. Rumpf, Bull. soc. chim. (5) **5**, 879 (1938).

Appendix
Chemical Abstracts Nomenclature (Collective Index Number); (Registry Number)

disulfonic acid

alcohol (64-17-5)

sodium sulfite (7757-83-7)

HYDROBROMIC ACID (10035-10-6)

sodium bromide (7647-15-6)

sodium bisulfite (7631-90-5)

Ethylene oxide (75-21-8)

ethylene dibromide,
ethylene bromide (106-93-4)

Taurine (107-35-7)

Sodium 2-bromoethanesulfonate,
Ethanesulfonic acid, 2-bromo-, sodium salt (4263-52-9)

isethionic acid (107-36-8)