



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.

In some articles in *Organic Syntheses*, chemical-specific hazards are highlighted in red "Caution Notes" within a procedure. It is important to recognize that the absence of a caution note does not imply that no significant hazards are associated with the chemicals involved in that procedure. Prior to performing a reaction, a thorough risk assessment should be carried out that includes a review of the potential hazards associated with each chemical and experimental operation on the scale that is planned for the procedure. Guidelines for carrying out a risk assessment and for analyzing the hazards associated with chemicals can be found in Chapter 4 of Prudent Practices.

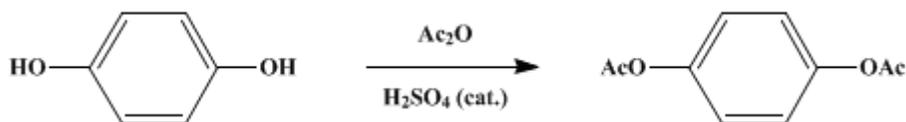
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These paragraphs were added in September 2014. The statements above do not supersede any specific hazard caution notes and safety instructions included in the procedure.

Organic Syntheses, Coll. Vol. 3, p.452 (1955); Vol. 28, p.68 (1948).

HYDROQUINONE DIACETATE

[Hydroquinone, diacetate]



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Checked by Homer Adkins and Maynette Vernsten.

1. Procedure

One drop of concentrated **sulfuric acid** is added to a mixture of 110 g. (1.0 mole) of **hydroquinone** and 206 g. (190.3 ml., 2.02 moles) of **acetic anhydride** (Note 1) in a 1-l. Erlenmeyer flask. The mixture is stirred gently by hand; it warms up very rapidly, and the **hydroquinone** dissolves. After 5 minutes the clear solution is poured onto about 800 ml. of crushed ice. The white crystalline solid which separates is collected on a Büchner filter and washed with 1 l. of water. The filter cake is pressed occasionally to facilitate the removal of water; the solid is dried to constant weight over **phosphorus pentoxide** in a vacuum desiccator. The nearly pure product weighs 186–190 g. (96–98%) and melts at 121–122° (Note 2); it can be recrystallized from dilute **ethanol** (Note 3).

2. Notes

1. The use of commercial **acetic anhydride** in this preparation sometimes results in appreciably lower yields. The checkers used the freshly redistilled reagent.
2. The melting point is recorded in the literature^{1,2} as 121° and as 123–124°.
3. Recrystallization from 50% **ethanol** (by weight) permits a 93–94% recovery of material melting at 121.5–122.5°; about 365 g. (400 ml.) of the solvent is required for 100 g. of the crude product.

3. Discussion

Hydroquinone diacetate has been prepared by the treatment of **hydroquinone** with **acetic anhydride**, both in the presence^{1,3,4} and in the absence^{5,6,7} of strong acid catalysts, by the treatment of the **sodium salt of hydroquinone** with **acetic anhydride**, and by the reaction of **hydroquinone** with **acetic anhydride** in the presence of **sodium acetate**.^{8,9} It has also been prepared from **hydroquinone** and **acetyl chloride**;¹⁰ the acetylation with **acetyl chloride** is reported to be improved by the addition of metallic **magnesium**.¹¹

This preparation is referenced from:

- [Org. Syn. Coll. Vol. 3, 280](#)

References and Notes

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3. Henle, *Ann.*, **350**, 344 (1906).
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6. Hesse, *Ann.*, **200**, 244 (1880).
7. Kaufmann, *Ber.*, **42**, 3482 (1909).
8. Sarauw, *Ann.*, **209**, 128 (1881).

9. Buchka, *Ber.*, **14**, 1327 (1881).
 10. Nietzki, *Ber.*, **11**, 470 (1878).
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Appendix
Chemical Abstracts Nomenclature (Collective Index Number);
(Registry Number)

ethanol (64-17-5)

sulfuric acid (7664-93-9)

acetic anhydride (108-24-7)

sodium acetate (127-09-3)

acetyl chloride (75-36-5)

hydroquinone (123-31-9)

magnesium (7439-95-4)

Hydroquinone diacetate,
Hydroquinone, diacetate (1205-91-0)

phosphorus pentoxide (1314-56-3)

sodium salt of hydroquinone