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.

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.

The procedures described in *Organic Syntheses* are provided as published and are conducted at one's own risk. *Organic Syntheses, Inc.*, its Editors, and its Board of Directors do not warrant or guarantee the safety of individuals using these procedures and hereby disclaim any liability for any injuries or damages claimed to have resulted from or related in any way to the procedures herein.

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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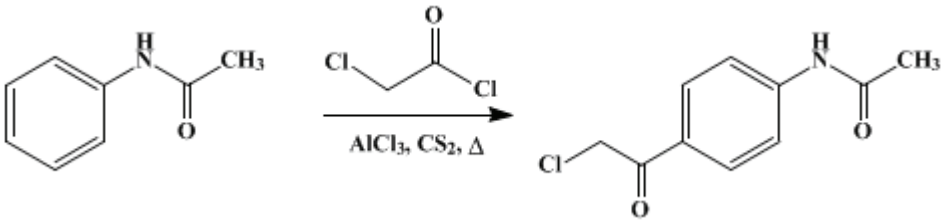
p-CHLOROACETYLACETANILIDE

[Acetanilide, *p*-chloroacetyl-]



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1. Procedure

Caution! Carbon disulfide, used as a solvent in this preparation, is highly inflammable; its vapor may ignite on contact with a hot laboratory steam line.

In a 5-l. three-necked flask mounted on a steam bath in the hood and equipped with a mechanical stirrer (Note 1) and a wide-bore condenser (Note 1) is placed 1.4 kg. (1.1 l.) of carbon disulfide. Through the open neck of the flask 202 g. (1.5 moles) of acetanilide and 300 g. (2.66 moles) of chloroacetyl chloride (Note 2) are introduced. The mixture is vigorously stirred while 600 g. (4.5 moles) of aluminum chloride is added in 25–50 g. portions over a period of 20–30 minutes; the neck of the flask is stoppered between additions (Note 3). After the addition of the last portion of aluminum chloride, the mixture is heated at reflux temperature for 30 minutes while stirring is continued. Heating and stirring are discontinued and the mixture is allowed to stand for 3 hours, during which time it separates into layers. The upper layer (carbon disulfide) is decanted, and the viscous red-brown lower layer is poured cautiously with stirring into about 1 kg. of finely crushed ice to which 100 ml. of concentrated hydrochloric acid has been added. After the hydrolysis of the aluminum chloride, the product crystallizes as a white solid, which is collected on a Büchner funnel and washed well with water. It is then transferred to a beaker where it is thoroughly washed by stirring with sufficient 95% ethanol to give a fluid slurry. The solid is again collected on the funnel. After drying in the air it melts at 213–214° and weighs 250–265 g. (79–83%). It can be recrystallized from 95% ethanol (about 1 l. of the solvent being required for 40 g. of the solid) as fine white crystals melting at 216°; the recovery in the recrystallization, without reworking of the mother liquor, is about 70%.

2. Notes

1. Unless a well-ventilated hood is available the stirrer should be provided with a seal and the condenser should be connected to a gas-absorption trap.
2. The chloroacetyl chloride should be weighed in the hood; it is strongly lachrymatory.
3. The addition of each portion of aluminum chloride causes vigorous boiling.

3. Discussion

The method of preparation given, devised by Kunckell,[1] is the only one reported.

References and Notes

1. Kunckell, *Ber.*, **33**, 2644 (1900).

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

ethanol (64-17-5)

hydrochloric acid (7647-01-0)

Acetanilide (103-84-4)

aluminum chloride (3495-54-3)

carbon disulfide (75-15-0)

chloroacetyl chloride (79-04-9)

p-Chloroacetylacetanilide,
Acetanilide, p-chloroacetyl- (140-49-8)