When the amine was boiled twelve hours in ethanol the recovery of material was quantitative and its chloroplatinate contained 29% of platinum.

CHEMICAL LABORATORY
UNIVERSITY OF TORONTO
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3-Benzyl-5,5-dimethylhydantoin

BY T. EARL JORDAN AND SARA GINSBURG[1]

3-Benzyl-5,5-dimethylhydantoin was prepared by treating benzyl chloride with 5,5-dimethylhydantoin. It was found that this compound would neither hydrolyze to the corresponding amino acid nor react with acetic anhydride under conditions which usually effect such reactions of substituted hydantoins. This stabilizing effect of the benzyl group was unexpected.[1a,2,3]

Experimental

The 5,5-dimethylhydantoin was prepared by a modification of the method of Bucherer and Libe.[4] A mixture of acetone, sodium cyanide and ammonium hydroxide (mole ratio of 1:1.2:1.35) was agitated with carbon dioxide in an autoclave at 150–200 lb. gage pressure and 80 ± 5° until adsorption ceased. The solvent medium was 50% ethanol–water solution sufficient to equal two and one-half times the weight of the reactants. The by-product sodium bicarbonate was filtered off, washed with alcohol; the filtrate and washings were combined, distilled until practically free of alcohol; the residue was treated with hydrogen peroxide to destroy any unreacted sodium cyanide, neutralized with dilute sulfuric acid and cooled. 5,5-Dimethylhydantoin was filtered off and recrystallized from water; yield, 82%; colorless needles, m. p. 175°.

3-Benzyl-5,5-dimethylhydantoin was obtained by treating 5,5-dimethylhydantoin with benzyl chloride in the presence of sodium bicarbonate (mole ratios of 1:1.3:1.4). Three hours were required for the addition of benzyl chloride; the refluxing and agitation were continued for five hours longer. On cooling, an oily solid precipitated. This was neutralized, filtered and recrystallized from 30% alcohol; yield, 80%; white needles, m. p. 106° (cor.).

Anal. Calcd.: C, 66.06; H, 6.42; N, 12.84. Found: C, 65.9; H, 6.6; N, 12.7. Solubility in H_2O: at 20°, 0.35 g. in 100 ml.; at 100°, 1.37 g. in 100 ml.; in boiling 50% alcohol, 100 g. in 100 g.; in boiling 30% alcohol, 20 g. in 100 g.

Attempts to hydrolyze the 3-benzyl-5,5-dimethylhydantoin with 60% sulfuric acid by refluxing for twenty-three hours resulted in practically no reaction. Refluxing with 80% sulfuric acid for ten hours resulted in a tar only.

Refluxing 3-benzyl-5,5-dimethylhydantoin for four hours with a large excess of acetic anhydride and a trace of concentrated sulfuric acid resulted in no reaction.

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[1] Present address: Physicians Drug & Supply Co., Philadelphia, Pa.

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CHEMICAL RESEARCH LABORATORY
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The Relative Efficiency of Various Surfaces for the Recombination of Hydrogen Atoms

BY SIDNEY KATZ, G. B. KISTIAKOWSKY AND ROBERT FRANK STEINER

An investigation has been made of the relative efficiency of various metallic surfaces in promoting the recombination of hydrogen atoms.

The steady-state temperature rise produced in the catalyst by the heat of recombination was taken as a measure of the relative effectiveness. Atomic hydrogen was produced by a 5000-volt a. c. discharge. A flow system was utilized, with hydrogen from a high pressure cylinder diffusing into the discharge tube through a long glass capillary. The pressure of hydrogen at one end of the capillary was maintained effectively constant by means of a mercury overflow bottle. Prior to entering the capillary, the hydrogen was bubbled through a dilute solution of sulfuric acid, to ensure the presence of sufficient moisture to inhibit atomic recombination on the walls.

Hydrogen, after leaving the discharge tube, streamed by the catalyst cone, which fitted over a glass thermocouple well, blown into the wall of the system and projecting into the center of hydrogen flow. Temperature rise was recorded by means of a copper–constantan thermocouple, one junction of which was inserted in the thermocouple well and the other immersed in an ice–water-bath. Measurements were made with a Leeds and Northrop student potentiometer. All readings were recorded in microvolts.

The catalyst cones were introduced into a separately evacuable chamber, placed above the thermocouple well, which was then closed and evacuated. It was separated from the hydrogen flow system by a large bore stopcock. The cones, suspended by threads, were lowered by means of a winch upon the thermocouple well, through the bore of the large stopcock. This arrangement permitted an interchange of catalyst cones without interruption of hydrogen flow or the electric discharge. The cones were turned from

TABLE I

Surface	$V_{\text{final}} - V_{\text{initial}} = \Delta V$ (microvolts) (average values)	$-\Delta V/\Delta V_{\text{cobalt}}$
	Run I	
Cobalt	1041	1.00
Nickel	950	0.91
Copper	767	.74
Chromium	735	.71
Brass	756	.73
Zinc	342	.33
Tin	90	.09
Cadmium	698	.67
Paraffin	240	.23
	Run II	
Cobalt	447	1.00
Nickel	410	0.92
Copper	312	.70
Zinc	146	.33
Brass	280	.63
	Run III	
Cobalt	696	1.00
Platinum	710	1.02
Iron	578	0.83