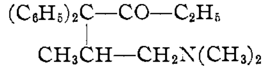
acid. The ketone was isolated as the sesquioxalate (m. p. 162–163°. *Anal.* Calcd. for $2C_{21}H_{27}ON\cdot 3H_2C_2O_4$: C, 64.86; H, 6.76; N, 3.15; $H_2C_2O_4$, 30.41; neut. equiv., 148. Found: C, 65.2; H, 6.66; N, 3.43, 3.39; $H_2C_2O_4$, 30.40; neut. equiv., 149). This was further characterized as the base (oil, b. p. 215° under 12 mm. *Anal.* Calcd. for $C_{21}H_{27}ON$: C, 81.50; H, 8.80; N, 4.53. Found: C, 81.50; H, 8.90; N, 4.54, 4.52), the hydrochloride (m. p. 189–191°. *Anal.* Calcd. for $C_{21}H_{27}ON\cdot HCl$: C, 72.92; H, 8.16; N, 4.05; Cl, 10.25. Found: C, 72.95; H, 8.14; N, 4.02, 4.08; Cl, 10.24), the picrate (m. p. 149–150°. *Anal.* Calcd. for $C_{21}H_{27}ON\cdot C_6H_3O_7N_3$: C, 60.22; H, 5.58; N, 10.41. Found: C, 59.95; H, 5.54; N, 10.55, 10.52) and the methiodide (m. p. 263–264°. *Anal.* Calcd. for $C_{22}H_{30}ONI$: C, 58.54; H, 6.70; N, 3.10; I, 28.11. Found: C, 58.45; H, 6.78; N, 3.06; I, 28.25, 28.35).



$$\begin{array}{l}(C_6H_5)_2C—CO—C_2H_5 \\ \quad\quad\quad\; | \\ \quad CH_3CH—CH_2N(CH_3)_2\end{array}$$

V

When the crude mixture obtained by the condensation of diphenylacetonitrile with 1-dimethylamino-2-chloropropane was treated with ethylmagnesium bromide, there was formed, among other products, another isomer of amidone, which has been designated as Isoamidone I. This was isolated as the binoxalate (m. p. 158–160°. *Anal.* Calcd. for $C_{21}H_{27}ON\cdot H_2C_2O_4$: C, 69.15; H, 7.32. Found: C, 69.20; H, 7.06). This was also characterized as the base (oil, b. p. 164–167° under 3 mm. *Anal.* Calcd. for $C_{21}H_{27}ON$: C, 81.50; H, 8.80; N, 4.53. Found: C, 81.35; H, 8.84; N, 4.76, 4.73), the hydrochloride (m. p. 172–173°. *Anal.* Calcd. for $C_{21}H_{27}ON\cdot HCl$: C, 72.92; H, 8.16; N, 4.05; Cl, 10.25. Found: C, 73.05; H, 8.21; N, 4.25, 4.22; Cl, 10.25) and the methiodide (m. p. 195–196°. *Anal.* Calcd. for $C_{22}H_{30}ONI$: C, 58.54; H, 6.70; I, 28.11. Found: C, 58.65; H, 6.85; I, 28.40, 28.50). From this, it appears that there is a third aminonitrile formed in the original condensation.

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THE CATHODIC PROTIUM-TRITIUM SEPARATION FACTOR

Sir:

Protium–tritium separation factors of 13.4 and 14.7 were observed in the electrolysis at 20.0° of a 10% sodium hydroxide solution at a smooth platinum foil cathode using a current density of 0.1 amp./sq.cm. The alkaline solution contained approximately 10^{-11} atom fraction tritium and had a normal deuterium content. Protium–deuterium separation factors of 6–8 have been reported for smooth platinum cathodes in both acid and alkaline media.[1]

Tritium activity was measured using a counting gas mixture consisting of hydrogen, ethyl alcohol, and argon at 25, 20 and 20 mm. partial pressure at 25° in a glass envelope copper gauze cathode Geiger counter having an effective counting volume of about 200 cc. Approximately 2×10^{-3} mole of hydrogen was produced in an electrolytic run, the isotopic composition of the medium remaining practically constant. Under these conditions the isotope separation factor equals the tritium–protium concentration ratio in the alkaline solution divided by that for the cathode gas. Water vapor was stripped from the latter using a liquid air trap and traces of oxygen were removed by combustion over a glowing nichrome wire. The tritium activity of the alkaline solution was determined by quantitatively converting the hydrogen in 0.05-g. samples of solution to hydrogen gas over magnesium at 630° in an analytical train previously "seasoned" at this activity. Table I summarizes the pertinent data.

TABLE I

Hydrogen source		Tritium activity in counts per minute per mm. at 25° of hydrogen gas	Isotope separation factor
Alkali solution		574 (Average, 571)	
		568	
Cathode gas	Electrolysis 1	38.9	14.7
	Electrolysis 2	42.7	13.4

The equilibrium constant at 20.2° for the reaction

$$HT + H_2O \rightleftharpoons H_2 + HTO$$

has been reported to be 6.47 ± 0.12 by Black and Taylor.[2] Libby[3] calculated a value of 6.24 for this equilibrium at 20°. The protium–tritium ratio for the hydrogen gas in the electrolyses reported above is thus slightly more than twice that corresponding to thermodynamic equilibrium conditions prevailing at the electrode interface. A detailed description of the analytical techniques developed for this study will be reported elsewhere. This investigation was supported by a grant from the Research Corporation.

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(1) B. Topley and H. Eyring, *J. Chem. Phys.*, **2**, 217 (1934); A. Eucken and K. Bratzler, *Z. physik. Chem.*, **A 174**, 269 (1935).

(2) J. F. Black and H. S. Taylor, *J. Chem. Phys.*, **11**, 395 (1943).

(3) W. F. Libby, *ibid.*, **11**, 101 (1943).

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RECEIVED MARCH 8, 1947

TAUTOMERISM IN CYCLOHEXANE DERIVATIVES; REASSIGNMENT OF CONFIGURATION OF THE 1,3-DIMETHYLCYCLOHEXANES

Sir:

It is now established that cyclohexane has predominantly the chair configuration.[1] Except for

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(1) R. Rassmussen, *J. Chem. Phys.*, **11**, 249 (1943), and others there cited.