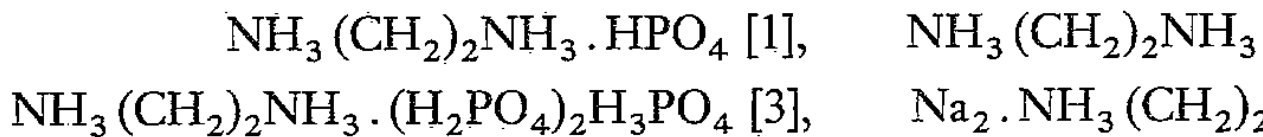
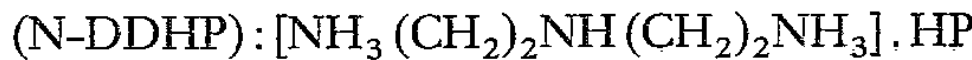


$\beta = 113.80 (1)^\circ$; $Z = 4$, $D_m = 1.544 \text{ Mg} \cdot \text{m}^{-3}$. The N-diethylene diammonium phosphate dihydrate (N-DDHP) salts is orthorhombic $P2_12_12_1$ with: $a = 16.067 (1) \text{ \AA}$; $c = 6.067 (1) \text{ \AA}$; $Z = 4$, $D_m = 1,440 \text{ Mg} \cdot \text{m}^{-3}$. The structure of these salts is based on the N-diethylene diammonium phosphate dihydrate (N-DDHP) salt, diamino-1,3 propane (or N-diéthylène diamine) and water molecules.

Abridged English Version — INTRODUCTION. — During a systematic reaction between monophosphoric acid and various kinds of aliphatic phosphates of ethylene diamine salts have been described:

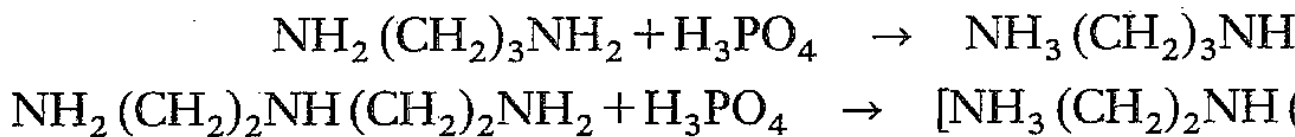


Up to now, monophosphate complexes of diamino-1,3 propane are unknown. In the present work, we describe the chemical preparation of diamino-1,3 propane monohydrogenmonophosphate monohydrate (DPHP): $[\text{NH}_3 (\text{CH}_2)_2 \text{NH}_2] \cdot \text{H}_2\text{PO}_4 \cdot \text{H}_2\text{O}$ and the N-diethylene diammonium monohydrogenmonophosphate monohydrate (N-DDHP): $[\text{NH}_3 (\text{CH}_2)_2 \text{NH} (\text{CH}_2)_2 \text{NH}_3] \cdot \text{H}_2\text{PO}_4 \cdot \text{H}_2\text{O}$.



The detailed crystallographic and structural features are given.

CHEMICAL PREPARATION. — The (DPHP) and the (N-DDHP) are prepared in a stoichiometric ratio a solution of monophosphoric acid H_3PO_4 and aqueous solutions of diamino-1,3 propane and N-diethylene diamine. The synthesis reactions are:



The resulting aqueous solutions are then kept at room temperature until evaporation, colorless parallelepiped shaped monocrystals of (DPHP) and (N-DDHP) are obtained.

Note présentée par Erwin-Félix BERTAUT.

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values of densities $D_m = 1.544 \text{ Mg} \cdot \text{m}^{-3}$ and $D_m =$ (DPHP) and the (N-DDHP) are in agreement with and $D_x = 1.451 \text{ Mg} \cdot \text{m}^{-3}$. Each cell contains four (N-DDHP). Indexed powder data are given in Table of these salts are given in Table III. The projection is depicted in Figure. The examination of the structure phosphate ions of the (N-DDHP) are individualized are linked together through hydrogen bond: O chains parallel to \vec{c} axis (cf. *Fig.*, A). The organic $[\text{NH}_3(\text{CH}_2)_2\text{NH}(\text{CH}_2)\text{NH}_3]^{2+}$, present as zwitterions to the monohydrogenmonophosphate ions through $\text{O}-\text{H} \dots \text{O}$. These hydrogen bonds involved (donors sional cohesion of the atomic arrangement.

INTRODUCTION. — L'étude de $(\text{NH}_3(\text{CH}_2)_2$ $[\text{NH}_3(\text{CH}_2)_3\text{NH}_3] \cdot \text{HPO}_4 \cdot \text{H}_2\text{O}$ s'inscrit dans le cadre action de l'acide monophosphorique $[\text{H}_3\text{PO}_4]$ avec diamines à courtes chaînes, plusieurs complexes de ont été mis en évidence : $\text{NH}_3(\text{CH}_2)_2\text{NH}_3 \cdot \text{HPO}_4$ $\text{NH}_3(\text{CH}_2)_2\text{NH}_3 \cdot (\text{H}_2\text{PO}_4)_2\text{H}_3\text{PO}_4$ [3], $\text{Na}_2 \cdot \text{NH}_3(\text{CH}_2)_2\text{NH}_3 \cdot \text{H}_2\text{PO}_4$ complexe de monophosphate du diamino-1,3 propane été jusqu'ici étudié. Dans le présent travail, nous de diammonium-1,3 propane monohydrogénomonophosphate du N-diéthylène diammonium monohydrogénomonophosphate conduisant à des produits cristallisés, et nous présentons les données chimiques et structurales.

$h k l$	$d_{\text{obs.}}$	$d_{\text{cal.}}$	$I_{\text{obs.}}$	$h k l$	d
0 2 0	8,33	8,33	42	2 1 1	2,
0 1 1	6,54	6,55	8	$\bar{1}$ 5 2	
1 0 0	6,37	6,36	20	$\bar{1}$ 2 3	2,
1 1 0	5,95	5,95	31	0 1 3	2,
$\bar{1}$ 1 1	5,75	5,75	55	$\bar{1}$ 3 3	
0 2 1	5,41	5,41	21	2 5 0	2,
1 2 0	5,05	5,06	10	0 2 3	2,
$\bar{1}$ 2 1	4,94	4,94	24	1 6 1	
0 3 1	4,38	4,38	33	$\bar{3}$ 1 1	2,
1 3 0	4,16	4,18	27	0 7 1	
0 4 0		4,16		$\bar{2}$ 5 2	2,
$\bar{1}$ 3 1	4,12	4,12	7	1 4 2	2,
$\bar{1}$ 0 2	3,837	3,836	47	1 7 0	
0 4 1	3,596	3,594	100	$\bar{2}$ 3 3	2,
$\bar{1}$ 4 0	3,485	3,484	27	$\bar{3}$ 2 1	2,
$\bar{1}$ 2 2		3,484		$\bar{1}$ 4 3	
0 1 2		3,482		2 4 1	2,
$\bar{2}$ 1 1	3,401	3,401	17	$\bar{2}$ 6 2	2,
0 2 2	3,273	3,274	5	3 2 0	
1 3 1	3,250	3,250	18	1 8 0	1,
2 0 0	3,183	3,182	97	0 7 2	
$\bar{2}$ 0 2	3,066	3,066	6	$\bar{1}$ 8 1	1,
0 5 1	3,015	3,017	11	2 7 0	
$\bar{2}$ 1 2		3,015		$\bar{2}$ 1 4	
$\bar{2}$ 3 1	2,945	2,945	23	2 3 2	1,
$\bar{1}$ 5 1	2,926	2,927	19	$\bar{2}$ 7 2	1,
$\bar{2}$ 4 1	2,667	2,667	15	$\bar{1}$ 2 4	
1 1 2	2,646	2,646	3	2 6 1	1,
1 5 1	2,561	2,562	17	$\bar{3}$ 5 2	
$\bar{1}$ 1 3		2,562		0 8 2	
1 6 0	2,544	2,544	8	3 2 1	1,
				0 9 1	

Les mesures ont été effectuées à la longueur d'onde du cobalt $K \alpha_1 \alpha_2$ à l'aide de deux cercles « STOE/CSS » avec une largeur de pas de $0,04^\circ$ en 2θ et un pas de $0,04^\circ$ en 2θ à chaque pas. Les intensités reportées dans ce tableau sont les hauteurs relatives des pics au-dessus du continu.

Data have been recorded with a two circle diffractometer "STOE/CSS" using step width 0.04° (2θ) and a scan time of 30 sec. on every step. Intensities reported are peak heights above the background.

Diagramme indexé de $\text{NH}_3(\text{CH}_2)_2\text{NH}(\text{CH}_2)_2\text{NH}_3$ *Indexed powder diagram for: $[\text{NH}_3(\text{CH}_2)_2\text{NH}(\text{CH}_2)_2\text{NH}_3]$*

$h k l$	$d_{\text{obs.}}$	$d_{\text{cal.}}$	$I_{\text{obs.}}$	$h k l$
2 0 0	8,47	8,47	68	6 0 0
2 1 0	6,62	6,61	19	6 1 0
1 0 1	5,71	5,71	16	4 0 1
0 2 0	5,28	2,29	79	5 0 0
3 1 0	4,98	4,98	8	1 1 0
2 0 1	4,94	4,93	9	3 0 1
2 2 0	4,48	4,48	24	0 2 0
4 0 0	4,23	4,23	9	1 0 0
3 0 1	4,13	4,13	28	7 0 1
4 1 0	3,929	3,930	51	4 1 0
1 2 1	3,880	3,879	36	3 1 1
3 1 1	3,848	3,849	56	7 1 1
2 2 1	3,606	3,606	100	7 2 1
4 0 1	3,471	3,471	50	3 0 1
4 1 1	3,299	3,299	39	4 1 1
3 2 1 } 2 3 0 }	3,255	3,255 } 3,253 }	51	5 2 1 } 8 3 0 }
5 1 0	3,227	3,225	7	6 1 0
0 0 2	3,033	3,033	52	8 0 2
1 3 1	2,998	2,998	37	0 3 1
2 0 2 } 5 2 0 }	2,852	2,856 } 2,852 }	42	7 0 2 } 3 2 0 }
2 1 2	2,756	2,756	8	5 1 2
6 1 0	2,727	2,727	10	2 1 0
3 3 1	2,682	2,681	3	
1 2 2 } 3 1 2 }	2,598	2,599 } 2,591 }	5	

Les conditions expérimentales sont identiques à celles décrites

Experimental conditions are similar to those described in Table

à la longueur d'onde de 430 mm; celle des protons
1,3 propane, N-diéthylène diammonium et du mono
métrie volumétrique [5].

H (1 C 2). . .	0,325 (5)	0,846 (2)	0,601 (5)	H (2 C 1). . .	0,103
H (2 C 2). . .	0,902 (6)	0,373 (3)	-0,010 (5)	H (1 C 2). . .	0,435
H (1 C 3). . .	0,163 (5)	0,924 (2)	0,249 (5)	H (2 2). . . .	0,350
H (2 C 3). . .	0,612 (5)	0,399 (2)	0,148 (5)	H (N 2). . . .	0,329
H (1 N 2). . .	0,903 (5)	0,299 (2)	0,307 (5)	H (1 C 3). . .	0,523
H (2 N 2). . .	0,716 (4)	0,189 (2)	0,842 (4)	H (2 C 3). . .	0,0097
H (3 N 2). . .	0,711 (5)	0,273 (2)	0,179 (5)	H (1 C 4). . .	0,421
				H (2 C 4). . .	0,450
				H (1 N 3). . .	0,169
				H (2 N 3). . .	0,173
				H (3 N 3). . .	0,289
				H (1 W 1). . .	0,083
				H (2 W 1). . .	0,086
				H (1 W 2). . .	0,982
				H (2 W 2). . .	0,432

Les déviations standards sont données entre parenthèses.

Standard deviations are given in parentheses.

L'analyse thermogravimétrique effectuée sur ces sels montre vement avec une molécule d'eau pour le (DPHP) : NH_3 (C deux molécules d'eau pour le (N-DDHP) : $[\text{NH}_3 (\text{CH}_2)_2\text{NH} (\text{C}$

ÉTUDE CRISTALLOGRAPHIQUE. — Les spectres d'oscillations e avec le rayonnement $\text{K}(\alpha_1, \alpha_2)$ du cuivre montrent que le cristallisent respectivement dans les systèmes monoclinique et paramètres suivants :

$$a = 6,956 (2) \text{ \AA}, \quad b = 16,654 (3) \text{ \AA}, \quad c = 7,782 (1) \text{ \AA},$$

et

$$a = 16,934 (2) \text{ \AA}, \quad b = 10,571 (2) \text{ \AA}, \quad c = 6,06$$

Ces paramètres ont été affinés par une méthode des moi données angulaires des réflexions relevées sur les diagramm composés et rapportées dans les tableaux I et II.

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