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Three New Types of Cyclotriphosphates

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Three New Types of Cyclotriphosphates

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The present work is more intended to illustrate three very different ways for the preparation of cyclotriphosphates than to describe three new types of such compounds.

A - Ba₃(P₃O₉)₂·4H₂O

An additional compound between BaCl₂ and Na₃P₃O₉ is produced when concentrated solutions of these two salts are mixed. This adduct, not yet clearly characterized, is destroyed by addition of water, leading to Ba₃(P₃O₉)₂·4H₂O.

Crystal data

a = 16.09(1) b = 8.368(5) c = 7.717(3) Å
β = 95.38(5)° Z = 2 C2/m.

Crystal structure with a final R value : 0.038 for 1489 reflexions. Four barium atoms are randomly distributed on a eightfold position.

B - Na₂LiP₃O₉·4H₂O

This salt is observed during preparations of lithium cyclotriphosphate trihydrate, Li₃P₃O₉·3H₂O by ion-exchange resins when the starting solution of sodium cyclotriphosphate is very concentrated.

Crystal data

a = 6.905(5) b = 9.346(5) c = 876(5) Å
γ = 107.75(5) Z = 2 Pī.

Crystal structure with a final R value : 0.019 for 3778 reflexions. Hydrogen atoms have been located and refined.

C - BaNaP₃O₉·3H₂O

This trihydrate is produced by prolonged standing at 55° of the tetrahydrate in presence of water.

Crystal data

a = 7.067(3) b = 9.071(3) c = 9.906(4) Å
α = 116.46(5) β = 95.97(5) γ = 74.03(5)
Z = 2 Pī

Crystal structure with a final R value : 0.028 for 3775 reflexions. Hydrogen atoms located and refined.