



>>Entry Name: Cobalt phosphate (Co₃(PO₄)₂)

Synonym(s): Cobalt(2+) phosphate (3:2), 9Cl. Cobalt(II) orthophosphate

CAS Registry Number: 13455-36-2

Related CAS Registry Numbers(s): 10101-56-1

Co₃(PO₄)₂

Molecular Formula: Co₃O₈P₂

Molecular Weight: 366.742

Accurate Mass: 366.706438

Percentage Composition: Co 48.21%; O 34.90%; P 16.89%

General Statement: Monoclinic. Co atoms occupy two distinct coord. polyhedra with coordination nos. 5 and 6 in ratio 2:1 P-O 152.6-155.4 pm, OPO 104.6-112.9°. Mean Co-O 212.5, 204.5 pm

Source/Synthesis: Synth. from CoCO₃ + (NH₄)H₂PO₄ at 900°; from monohydrate at 350°

Physical Description: Deep reddish-violet plates

Other Data: Exists in low pressure and high pressure forms

>>Derivative: Monohydrate

CAS Registry Number: 60305-65-9

Source/Synthesis: Synth. from dihydrate at 250°

Physical Description: Light reddish-purple needles

Other Data: Co atoms are coordinated to 5 or 6 oxygen atoms with P-O 151.9-154.1 pm, OPO 103.4-112.7°, Co-O 197.6-220.9 pm

>>Derivative: Dihydrate

CAS Registry Number: 96143-80-5

Source/Synthesis: Synth. from 3.5 hydrate at 200° or octahydrate at 150°

Physical Description: Dark purple-red granules

>>Derivative: 3.5 Hydrate

Source/Synthesis: Synth. from octahydrate at 150°

Physical Description: Light bluish-purple plates

>>Derivative: Tetrahydrate

CAS Registry Number: 36550-56-8

Source/Synthesis: Synth. by hydrothermal hydrol. of CoHPO₄·1.5H₂O at 130°; or from Co²⁽⁺⁾ aq. with hot Na₂HPO₄ soln.

Physical Description: Pale blue rosettes of thin prisms

Other Data: The H₂O molecules are coordinated to the Co

>>Derivative: Octahydrate

CAS Registry Number: 10294-50-5

Source/Synthesis: Synth. from Co²⁽⁺⁾ solns. with cold aq. Na₂HPO₄ or Na₃PO₄, or CoCO₃ + H₃PO₄

Physical Description: Small pink or large red diamond-shaped cryst.

Other Data: When heated, loses 4H₂O reversibly, but product is not identical to the tetrahydrate. It is thought that 2H₂O are held in phosphate lattice, and 6H₂O are coordinated to Co. Isotypic with the octahydrate of Iron phosphate (Fe₃(PO₄)₂) [HTM88-N](#)

References:

- Bassett, H. *et al.*, *J.C.S.*, 1933, 871, (*synth*)
Mays, J.M., *Phys. Rev.*, 1957, **108**, 1090, (*P-31 nmr*)
Klement, R. *et al.*, *Z. Anorg. Allg. Chem.*, 1964, **334**, 27, (*synth*)
Mauk, V.V. *et al.*, *Zh. Prikl. Spektrosk.*, 1970, **12**, 913; *J. Appl. Spectrosc. (Engl. Transl.)*, 1970, **12**, 683, (*pmr*)
Dey, A.K. *et al.*, *J. Chem. Phys.*, 1973, **59**, 1397
Nord, A.G. *et al.*, *Acta Chem. Scand., Ser. A*, 1974, **28**, 150; 1983, **37**, 715, (*cryst struct, synth*)
Anderson, J.B. *et al.*, *J. Solid State Chem.*, 1975, **14**, 372, (*cryst struct*)
Anderson, J.B., *Inorg. Chem.*, 1976, **15**, 2744, (*synth, cryst struct*)
Mel'nikova, R.Ya. *et al.*, *Zh. Neorg. Khim.*, 1980, **25**, 3333; *Russ. J. Inorg. Chem. (Engl. Transl.)*, 1980, **25**, 1824, (*ir, struct*)
Toda, Y. *et al.*, *CA*, 1986, **104**, 198876, (*synth, props*)
Theodoret *et al.*, *Rev. Chim. Miner.*, 1987, **24**, 478, (*cryst struct*)
Sharov, V.A. *et al.*, *Zh. Neorg. Khim.*, 1987, **32**, 523; *Russ. J. Inorg. Chem. (Engl. Transl.)*, 1987, **32**, 292, (*magnetism*)
Forsyth, J.B. *et al.*, *J. Phys. C: Solid State Phys.*, 1988, **21**, 2005, (*nd, magnetism*)
Rion, A. *et al.*, *Acta Cryst. C*, 1989, **45**, 1412, (*synth, cryst struct*)
Shchegnov, L.N. *et al.*, *Zh. Neorg. Khim.*, 1989, **34**, 1488; *Russ. J. Inorg. Chem. (Engl. Transl.)*, 1989, **34**, 840, (*ir, props*)