



>>Entry Name: Arsenic selenide (As₂Se₃), 9Cl, 8Cl

Synonym(s): Diarsenic(III) triselenide. Selenium arsenide. Arsenic sesquiselenide

CAS Registry Number: 1303-36-2

As₂Se₃

Molecular Formula: As₂Se₃

Molecular Weight: 386.723

Accurate Mass: 389.592748

Percentage Composition: As 38.75%; Se 61.25%

General Statement: Monoclinic. In cryst. each As atom is surrounded by polyhedron of 7 Se atoms forming distorted tetragonal pyramid and triangular prism, one face of which coincides with base of pyr. Mean As-Se 240 pm. Also known in amorphous and vitreous forms

Source/Synthesis: From As₄Se₄ at 260°; annealing of vitreous form at 320°; As + Se heated *in vacuo* → amorphous form

Use/Importance: Photoconductor and important xerographic photoreceptor, props. better than those of Se itself. Semiconductor. Used in glass optical fibres. Commercially available

Physical Description: Cherry red cryst.

Melting Point: Mp 380° (370°)

Boiling Point: Bp 861° (extrap.) (846°)

>>Variant: Vitreous-form

Molecular Formula: As₂Se₃

Molecular Weight: 386.723

Accurate Mass: 389.592748

Percentage Composition: As 38.75%; Se 61.25%

General Statement: Trigonal struct.

Physical Description: Stable, brown, semi-conducting glass

Other Data: Cryst. at 280° after softening at *ca.* 180-187°. $\Delta H_{298}^\circ -122$ kJ. Annealing of quenched glass leads to structural stabilisation (ordering) without structural change; atypical behaviour of arsenic sesquichalcogenides

References:

- Gmelin Handbook Inorg. Chem., Syst. No. 17, 1952, 463, (rev, bibl)
Myers, M.B. *et al.*, Mater. Res. Bull., 1967, **2**, 535, (synth, phase diagram)
Kravchenko, E.A. *et al.*, Phys. Status Solidi, 1969, **31**, K19, (nqr)
Whitfield, H.J., Aust. J. Chem., 1971, **24**, 697, (synth, ir)
Renninger, A.L. *et al.*, Acta Cryst. B, 1973, **29**, 1583, (cryst struct)
Zakharov, V.P. *et al.*, Izv. Akad. Nauk SSSR, Neorg. Mater., 1973, **9**, 891; Inorg. Mater. (Engl. Transl.), 1973, **9**, 791, (synth, ir)
Arai, T. *et al.*, J. Non-Cryst. Solids, 1975, **18**, 289, (vib spectra)
Baker, E.H., J.C.S. Dalton, 1975, 1589, (synth, props)
Nabitovich, I.D. *et al.*, Kristallografiya, 1976, **21**, 620; Sov. Phys. Crystallogr. (Engl. Transl.), 1976, **21**, 348, (ed)
Strom, U. *et al.*, Phys. Rev. B: Solid State, 1977, **16**, 5512, (ir, microwave)
Bahl, M.K. *et al.*, J. Chem. Phys., 1980, **72**, 4069, (pe, Auger)
Gosh, B. *et al.*, Prog. Cryst. Growth Charact., 1983, **6**, 393, (cryst, props, rev)
Freitas, J.A. *et al.*, J. Non-Cryst. Solids, 1985, **77-78**, 1125, (Raman)
Stergiou, A.C. *et al.*, Z. Kristallogr., 1985, **173**, 185, (synth, cryst struct)
Antonelli, A. *et al.*, Phys. Rev. B: Solid State, 1986, **33**, 2968, (struct)
Tarnow, E. *et al.*, Phys. Rev. B: Solid State, 1986, **34**, 4059, (struct)
Neverov, V.G. *et al.*, Izv. Akad. Nauk SSSR, Neorg. Mater., 1989, **25**, 225; Inorg. Mater. (Engl. Transl.), 1989, **25**, 191
Tverjanovich, A. *et al.*, J. Non-Cryst. Solids, 1998, **223**, 86-90, (vitreous form, powder struct)