



>>Entry Name: Molybdenum sulfides

CAS Registry Number: 12612-50-9

Related CAS Registry Numbers(s): 20820-34-2 23261-43-0 54427-19-9 57620-25-4 82378-44-7 95326-80-0 105109-94-2 110739-89-4 111346-28-2 111747-26-3 113938-05-9 113939-27-8 113939-28-9 113939-29-0 113939-30-3 113939-31-4 113939-32-5 113939-33-6 118820-85-2 118820-86-3 119355-17-8 124349-14-0 124545-83-1 125634-58-4 126548-66-1 127006-39-7 128450-06-6

Molecular Formula: [MoS]

>>Variant: Molybdenum sulfide (Mo₃S₄)

CAS Registry Number: 39432-48-9

Molecular Formula: Mo₃S₄

Molecular Weight: 416.084

Accurate Mass: 421.604498

Percentage Composition: Mo 69.17%; S 30.83%

Source/Synthesis: Obt. by leaching ternary phases M_xMo₃S₄ (M = small cation e.g. Cu, Ni, Co, Fe, Mn, Cr, Mg, Cd, Zn) with hydrochloric acid

Use/Importance: Of interest with respect to preparation and superconducting props. of ternary phase M_xMo₃S₄ (M = Ni, Cu, Fe) e.g. Molybdenum tin sulfide (Mo₆SnS₈)

[HWX74-E](#)

Physical Description: Black solid

Solubility: Insol. H₂O, org. solvs.

>>Variant: Molybdenum sulfide (Mo₆S₈)

CAS Registry Number: 57620-25-4

Molecular Formula: Mo₆S₈

Molecular Weight: 832.168

Accurate Mass: 843.208996

Percentage Composition: Mo 69.17%; S 30.83%

>>Variant: Molybdenum sulfide (Mo₂S₃)

Synonym(s): Molybdenum sesquisulfide

CAS Registry Number: 12033-33-9

Molecular Formula: Mo₂S₃

Molecular Weight: 288.078

Accurate Mass: 291.727022

Percentage Composition: Mo 66.61%; S 33.39%

Source/Synthesis: Obt. by heating Mo and S (2:3 atomic ratio) in an evacuated quartz ampoule at 1300-1400°

Use/Importance: Refractory; used for impregnating porous ceramics

Physical Description: Steel-grey solid. Oxidises in air > 350° → MoO₃

Solubility: Insol.

>>Variant: Molybdenum sulfide (MoS₂)

CAS Registry Number: 1317-33-5

Extra CAS Registry Numbers(s): 1309-56-4

Molecular Formula: MoS₂

Molecular Weight: 160.072

Accurate Mass: 161.849546

Percentage Composition: Mo 59.94%; S 40.06%

modification also exists. X-ray amorphous material, obt. by thermal dec. of ammonium thiomolybdates, contains bent open-ended lamellae of MoS₂, in contrast to cryst. form which contains closed shells (fullerene-like structs.)

Source/Synthesis: Formed directly from elements at about 1100°. Mineral form *Molybdenite* is the principal Mo ore. Amorphous material produced by thermal dec. of various ammonium thiomolybdates, e.g. (NH₄)₂Mo₃S₁₃·xH₂O, at 400°

Use/Importance: Good lubricant owing to lamellar struct. Catalyst in variety of hydrogenation/dehydrogenation desulfurisation reactions in the petroleum industry. Forms a novel nanocomposite material with conducting polymer polyaniline. Enhancement of elect. conductivity. Has potential for use as battery electrodes

Physical Description: Mineral form is lustrous lead grey. Synthetic form is black powder. Dec. on heating in air to MoO₃ and *in vacuo* to Mo₂S₃

Melting Point: Mp 1185°. Mp 2375°

Solubility: Insol. H₂O, org. solvs., dil. acids

Other Data: Dissociates on heating. Begins to sublime at 450°. Diamagnetic, *n*- and *p*-type semiconductor. Amorphous form has high porosity and large surface area; acts as host to both small molecules (ferrocene) and polymers (poly(ethylene oxide))