



>>Entry Name: Cobalt samarium system

Synonym(s): Samarium cobalt. Cobalt samarium. Samarium cobalt alloys

Molecular Formula: [CoSm]

General Statement: Several widely studied phases reported here

Other Data: Similar compds. formed with other lanthanides, but less industrial use

>>Variant: Samarium compd. with cobalt (1:2)

Synonym(s): Samarium cobalt (SmCo₂). Cobalt samarium (Co₂Sm)

CAS Registry Number: 12017-43-5

Molecular Formula: Co₂Sm

Molecular Weight: 268.226

Accurate Mass: 269.786125

Percentage Composition: Co 43.94%; Sm 56.06%

General Statement: MgCu₂ struct.

>>Variant: Samarium compd. with cobalt (1:3)

Synonym(s): Samarium cobalt (SmCo₃). Cobalt samarium (Co₃Sm)

CAS Registry Number: 12187-46-1

Molecular Formula: Co₃Sm

Molecular Weight: 327.16

Accurate Mass: 328.719323

Percentage Composition: Co 54.04%; Sm 45.96%

>>Variant: Samarium compd. with cobalt (2:7), ¹¹Cl

Synonym(s): Samarium cobalt (Sm₂Co₇). Cobalt samarium (Co₇Sm₂)

CAS Registry Number: 12305-84-9

Molecular Formula: Co₇Sm₂

Molecular Weight: 713.252

Accurate Mass: 716.371844

Percentage Composition: Co 57.84%; Sm 42.16%

Use/Importance: Material for magnets; catalyst for dehydrogenation of organic compds. (e.g. MeOH, cyclohexene)

Physical Description: Metal

Aldrich: 33922-9

>>Variant: Samarium compd. with cobalt (1:5), ¹¹Cl

Synonym(s): Vacomax. Samarium cobalt (SmCo₅). Cobalt samarium (Co₅Sm)

CAS Registry Number: 12017-68-4

Molecular Formula: Co₅Sm

Molecular Weight: 445.026

Accurate Mass: 446.585719

Percentage Composition: Co 66.21%; Sm 33.79%

General Statement: Most important Co-Sm compd.

Source/Synthesis: Synth by heating Sm₂O₃/Co/Ca in H₂ atm. at 1150° or by similar alternative reductions

Use/Importance: Widely investigated permanent magnet material (Sm_{0.5}Pr_{0.5}Co₅ similarly) with high coercivity. Absorbs H₂, catalyst for hydrogenation of org. compds. e.g. PhNO₂, PhCOCH₃, cyclohexane. Catalyses hydrogenation of CO to form hydrocarbons

Physical Description: Metal

Other Data: *T_c* 724°

Aldrich: 33921-0

>>Variant: Samarium compd. with cobalt (2:17), ¹¹Cl

Synonym(s): Samarium cobalt (Sm₂Co₁₇). Cobalt samarium (Co₁₇Sm₂)

CAS Registry Number: 12052-78-7

Molecular Formula: Co₁₇Sm₂

Molecular Weight: 1302.584

Accurate Mass: 1305.703824

Percentage Composition: Co 76.91%; Sm 23.09%

General Statement: TbCu₇ struct.

Use/Importance: Dehydrogenates organic compds. Material for magnets

Physical Description: Metal

Melting Point: Mp 1375°

Other Data: Ferrimagnetic. *T_c* 440°. Exists in 3 cryst. forms; two are superstructures of high temp. disordered phase. (Th₂Zn₁₇ struct.)