



>>Entry Name: Tributylstannane, 9CI

Synonym(s): Tributyltin hydride

CAS Registry Number: 688-73-3

BB0300 BB0350 BB0370 BB0380 BB0390 BB0400 BB0410 BB0465 BB0480 BB0490 BB0620 BB0650

(H₃CCH₂CH₂CH₂)₃SnH

Molecular Formula: C₁₂H₂₈Sn

Molecular Weight: 291.063

Accurate Mass: 290.1213

Percentage Composition: C 49.52%; H 9.70%; Sn 40.78%

Source/Synthesis: Synth. from Bu₃SnOMe and B₂H₆ in pentane, or by LiAlH₄ redn. of Tributylchlorostannane [GGH37-A](#)

Use/Importance: Reducing agent: phenylseleno esters, acyl halides → aldehydes; phenyl carboselenates, α-haloketones, selenoketals, carboxylate esters, some secondary and tertiary nitro groups, 1,3-dithiolanes/dithioacetals, primary amines → hydrocarbons; dithioesters → dithioacetals; acyl azides → amines; aryldiazonium salts → ArH; ketones → alcohols, aldehydes also reduced but yield is low; enones → ketones; enals → aldehydes; also reagent for hydrogenolysis of vinyl triflates, allyl amines, allyl acetates, benzyl ethers, thiols, benzyl thioethers, vinyl sulfides, thioketals, alkyl tosylates, isonitriles, nitroalkanes, N-chloroimines, phenyl selenides, phenyl tellurides. Dehalogenating reagent, mostly under radical conditions, e.g. AIBN, for aliphatic, aromatic, vinyl halides, halophosphines, haloboranes,; dehalogenation is often followed by radical cyclisations. Deoxygenates alcohols, diols via benzoates, xanthates, thiocarbonates, phenylselenocarbonates, etc. Hydrostannylates alkenes, dienes, alkynes; reduces C=C bond of unsatd. esters, nitriles. Generates radicals from phenylseleno ethers. Used in *anti*-radical elimination of γ-phenylthio-β-nitroalcohols → allylic alcohols. Deprotects allyl ethers, allyl carbamates → alcohols, allyl urethanes → amines. With AIBN, used in vinyl radical cyclisation of enynes; radical macrocyclisation of ω-iodo enones; cyclisation of N-acyl-1,2-dihydroisoquinolines → benzoindolizidin-3-ones. With CO and a Pd complex catalyst, converts aryl, vinyl, benzyl, allyl halides to aldehydes. With Py, reacts with aliphatic chromium carbenes → α-alkoxytin compds. with good stereoselection. Polym. catalyst

Physical Description: Liq.

Boiling Point: Bp₈ 112.5-113.5°. Bp_{0.7} 76°

Density: d²⁰ 1.103

Hazard & Toxicity: Fl. p. 40°

Aldrich: 23478-8

Fluka: 90915

Rare Chemicals Library: S61904-3

Sigma: T4767

Other: Gelest SNT8130

>>Derivative: Li salt

Molecular Formula: C₁₂H₂₇LiSn

Molecular Weight: 296.996

Accurate Mass: 296.129478

Percentage Composition: C 48.53%; H 9.16%; Li 2.34%; Sn 39.97%

Use/Importance: Distannylates alkynes in the presence of MeMgI/MnCl₂; undergoes conjugate addn. to enones, but direct addn. to enals also known; adds 1,4- to cyclohexenone in THF, but 1,2- in Et₂O; undergoes conjugate addn. to α,β-unsatd. sulfones, SiO₂ or thermol. causes β-elimination to alkenes; adds Bu₃Sn to aldehydes → ethers; adds to thionolactones; cleaves 2-bromoethyl esters; reacts with carboxylic esters and BF₃·Et₂O → acyl stannanes; reacts with (1-propenyl)triphenylphosphonium bromide → β-stannyl ylide, Ph₃P=CHCH(Me)SnBu₃, which effects propenylation of aldehydes with high *syn*- and (*E*)-selectivity; substitutes allyl phosphates in the presence of Et₂AlCl and catalytic Pd(0); with Me₃Al, stereoselectively deoxygenates epoxides; transmetallates vinyl chlorides

References: