>>**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
$(H_3CCH_2CH_2CH_2)_3SnH$

Molecular Formula: $C_{12}H_{28}Sn$
Molecular Weight: 291.063
Accurate Mass: 290.1213
Percentage Composition: C 49.52%; H 9.70%; Sn 40.78%
Source/Synthesis: Synth. from Bu_3SnOMe and B_2H_6 in pentane, or by $LiAlH_4$ 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: Bp_8 112.5-113.5°. $Bp_{0.7}$ 76°
Density: d^{20} 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: $C_{12}H_{27}LiSn$
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 $MeMgI/MnCl_2$; undergoes conjugate addn. to enones, but direct addn. to enals also known; adds 1,4- to cyclohexenone in THF, but 1,2- in Et_2O; undergoes conjugate addn. to α,β-unsatd. sulfones, SiO_2 or thermol. causes β-elimination to alkenes; adds Bu_3Sn to aldehydes → ethers; adds to thionolactones; cleaves 2-bromoethyl esters; reacts with carboxylic esters and $BF_3.Et_2O$ → acyl stannanes; reacts with (1-propenyl)triphenylphosphonium bromide → β-stannyl ylide, $Ph_3P{=}CHCH(Me)SnBu_3$, which effects propenylation of aldehydes with high *syn*- and (*E*)-selectivity; substitutes allyl phosphates in the presence of Et_2AlCl and catalytic Pd(0); with Me_3Al, stereoselectively deoxygenates epoxides; transmetallates vinyl chlorides

References: