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(54) Title: INORGANIC SILYL AND POLYSILYL DERIVATIVES OF GROUP V ELEMENTS AND METHODS OF SYN-
THESIZING THE SAME AND METHODS OF USING THE SAME FOR DEPOSITION

(57) Abstract: Disclosed are Group V element-containing precursors and methods of synthesizing the same and using the same on
film depositions. The precursors are $(\text{SiR}_3)_{3-m}\text{A}(\text{Si}_a\text{H}_{2a+1})_m$, $(\text{SiR}_3)_{3-n-p}\text{A}(\text{Si}_a\text{H}_{2a+1})_n(\text{Si}_b\text{H}_{2b+1})_p$ or $\text{A}(\text{Si}_a\text{H}_{2a+1})(\text{Si}_b\text{H}_{2b+1})(\text{Si}_c\text{H}_{2c+1})$
wherein a 1 to 6; b = 1 to 6; c = 1 to 6; a ≠ b ≠ c; m = 1 to 3; n = 1 to 2, p = 1 to 2, n + p = 2 to 3; A = As, P, Sb, Bi; and R is selected
from a C₁ to C₁₀ linear, branched or cyclic alkyl, alkenyl, alkyl group. The synthesis methods include one-step, two-step or three-
step reaction(s) between halo(poly)silane(s) and a tris(trialkylsilyl) derivative of A or a one-pot mixing reaction between a mixture of
two or three halo(poly)silanes and the tris(trialkylsilyl) derivative of A. The deposition methods include CVD, PECVD, ALD, PEALD,
flowable CVD, HW-CVD, Epitaxy, or the like.