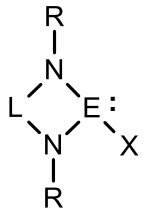
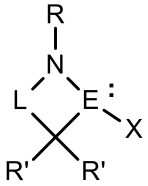
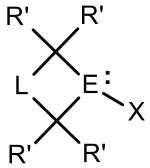
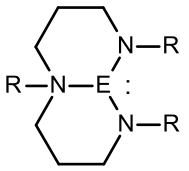
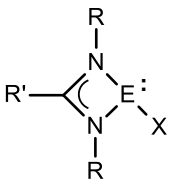
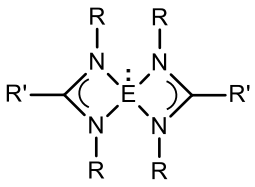
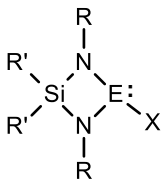
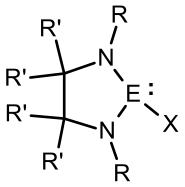
Claims

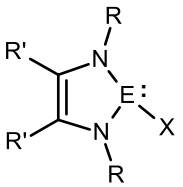
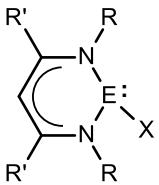
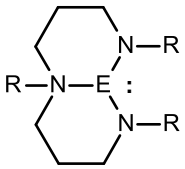
1. Process for preparing metal- or semimetal-containing films comprising
(a) depositing a metal- or semimetal-containing compound from the gaseous state onto a solid substrate and
(b) bringing the solid substrate with the deposited metal- or semimetal-containing compound in contact with a compound of general formula ~~(II), (III), or (IV)~~(II), (III), (IV) or (IIg)

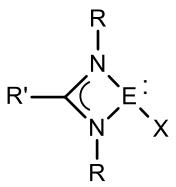

(II)

(III)

(IV)

(IIg)

wherein E is Ge or Sn,
R is an alkyl group, an alkenyl group, an aryl group, or a silyl group,
R' are an alkyl group, an alkenyl group, an aryl group, or a silyl group,
X is nothing, hydrogen, a halide, an alkyl group, an alkylene group, an aryl group, an alkoxy group, an aryl oxy group, an amino group, or a amidinate group, or an guanidinate group,
L is an alkyl group, an alkenyl group, an aryl group, or a silyl group,
wherein the compound of general formula (II), (III), (IV) or (IIg) acts as a reducing agent on the deposited metal- or semimetal-containing compound.

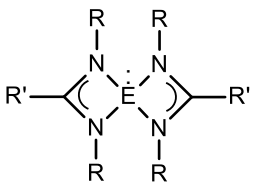
2. The process according to claim 1, wherein compound of the compound of general formula (II) is a compound of general formula (IIa), (IIb), (IIc), (IId), (IIe), (IIf)


(IIa)

(IIb)

(IIc)

(IId)

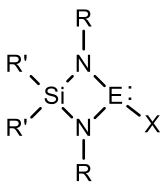

(IIe)

(IIf)

(IIg)



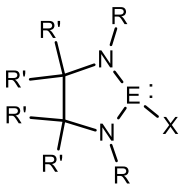
(IIa)



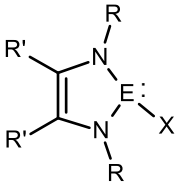
(IIb)



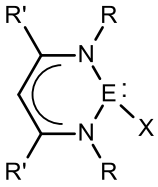
(IIc)



(IId)



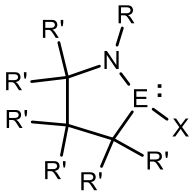
(IIe)



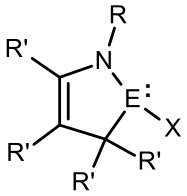
(IIf)

wherein R' is an alkyl group, an alkenyl group, an aryl group, or a silyl group.

3. The process according to claim 1, wherein the compound of general formula (III) is a compound of general formula (IIIa) or (IIIb)

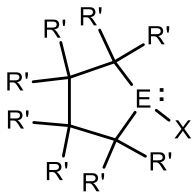


(IIIa)

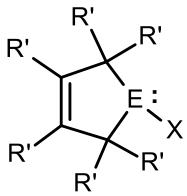


(IIIb)

4. The process according to claim 1, wherein the compound of general formula (IV) a compound of general formula (IVa) or (IVb).



(IVa)



(IVb)

5. The process according to any of the claims 1 to 4, wherein R bears no hydrogen atom in the 1-position.

6. The process according to any of the claims 1 to 5, wherein the compound of general formula ~~(II), (III), or (IV)~~(II), (III), (IV) or (IIg) has a molecular weight of not more than 600 g/mol.

7. The process according to any of the claims 1 to 6, wherein the compound of general formula ~~(II), (III), or (IV)~~(II), (III), (IV) or (IIg) has a vapor pressure at least 1 mbar at a temperature of 200 °C.

8. The process according to any of the claims 1 to 7, wherein (a) and (b) are successively performed at least twice.

9. The process according to any of the claims 1 to 8, wherein the metal- or semimetal-containing compound contains Ti, Ta, Mn, Mo, W, Ge, Ga, As or Al.

10. The process according to any of the claims 1 to 9, wherein the metal- or semimetal-containing compound is a metal or semimetal halide.

11. The process according to any of the claims 1 to 10, wherein the temperature does not exceed 350 °C.

12. The process according to any of the claims 1 to 11, wherein the metal- or semimetal-containing compound and the compound of general formula ~~(II), (III), or (IV)~~(II), (III), (IV) or (IIg) are brought into the gaseous state by heating them to a temperature of 20 °C to 200 °C.

13. The process according to any of the claims 1 to 12, wherein the metal- or semimetal-containing film is a metal or semimetal film, a metal or semimetal nitride film, a metal or semimetal carbide film, a metal or semimetal carbonitride film, a metal or semimetal alloy films, or an intermetallic compound film.

14. The process according to any of the claims 1 to 13, wherein the metal- or semimetal-containing film has an electrical conductivity of at least 10^4 S/m.

15. The process according to any of the claims 1 to 14, wherein metal- or semimetal-containing film contains in sum less than 5 weight-% nitrogen.