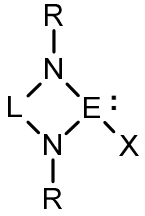
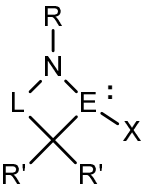
Claims

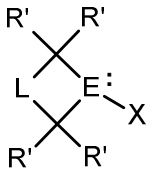
1. Process for preparing metal- or semimetal-containing films comprising
(a) depositing a metal- or semimetal-containing compound from the gaseous state onto a solid substrate and
(b) bringing the solid substrate with the deposited metal- or semimetal-containing compound in contact with a compound of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



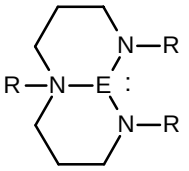
(II)



(III)



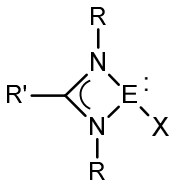
(IV)



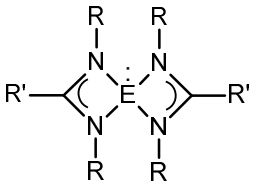
(IIg)

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.

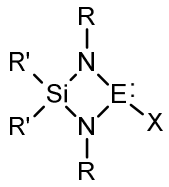
2. The process according to claim 1, wherein compound of the compound of general formula (II) is a compound of general formula (IIa), (IIb), (IIc), (IId), (IIe), (IIf)



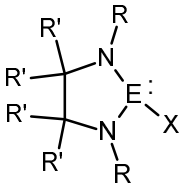
(IIa)



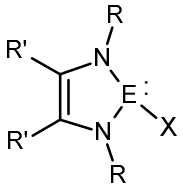
(IIb)



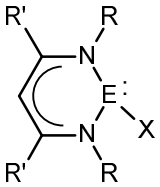
(IIc)



(IId)



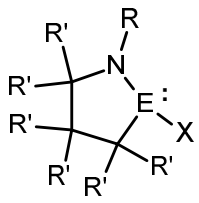
(IIe)



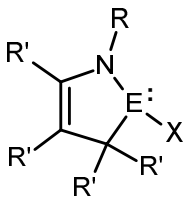
(IIf)

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)

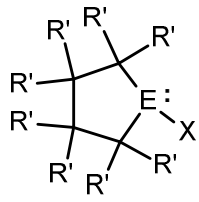


(IIIa)

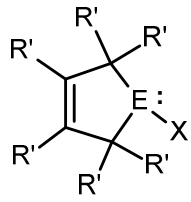


(IIIb) .

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), (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), (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 solid substrate is at a temperature from 100 °C to 300 °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), (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.