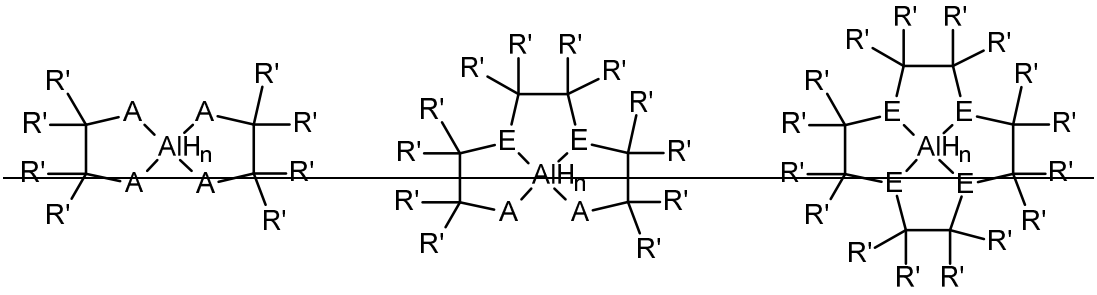
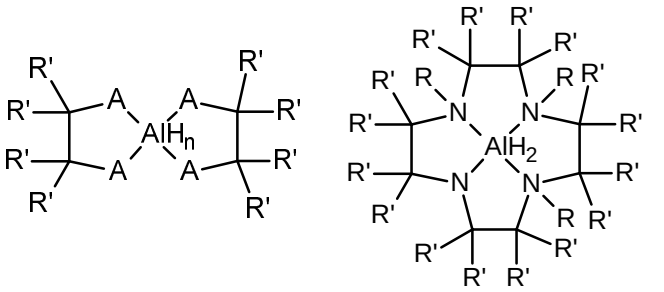
Claims

1. Process for preparing inorganic 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 in contact with a compound of general formula (I)~~, (II),~~ or (III<u>k</u>) in the gaseous state



(I) (II) (III)



(I) (IIIk)

wherein A is NR, NR_2, PR, PR_2, O, OR, S, or SR,
~~E is N, NR, P, PR, O or S,~~
n is 1, 2, or 3,
R is an alkyl group, an alkenyl group, an aryl group, or a silyl group and
R' is hydrogen, an alkyl group, an alkenyl group, an aryl group, or a silyl group, and
A, ~~E,~~ and n are chosen such that the compound of general formula (I), (II), or (III) is electronically neutral<u>,</u>
<u>wherein the compound of general formula (I) or (IIIk) has a molecular weight of not more than 500 g/mol</u>.

2. The process according to claim 1, wherein R is methyl, ethyl, iso-propyl, sec-butyl, tert-butyl, trimethylsilyl.

3. The process according to claim 1 or 2, wherein R bears no hydrogen atom in the 1-position.

4. The process according to any of the claims 1 to 3, wherein n is 1 or 2.

5. The process according to any of the claims 1 to 4, wherein the compound of general formula (I), (II), or (III) has a melting point of -80 to 125 °C.

6. The process according to any of the claims 1 to 5, wherein the metal- or semimetal-containing compound contains Ti, Ta, Mn, Mo, W, Ge, Ga, As, In, Sb, Te, Al or Si.

7. The process according to any of the claims 1 to 6, wherein the metal- or semimetal-containing compound is a metal or semimetal halide.

~~8. The process according to any of the claims 1 to 7, wherein the inorganic metal- or semimetal-containing films contains a metal, a metal nitride, a metal carbide, a metal carbonitride, a metal alloy, an intermetallic compound or mixtures thereof.~~

~~9.~~8. The process according to any of the claims 1 to ~~8~~7, wherein the sequence comprising (a) and (b) is performed at least twice.

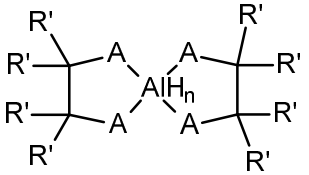
~~10.~~9. The process according to any of the claims 1 to ~~9~~8, wherein the process is an atomic layer deposition process.

~~11.~~10. The process according to any of the claims 1 to ~~10~~9, wherein the compound of general formula (I), (II), or (III) has a molecular weight of not more than 600 g/mol.

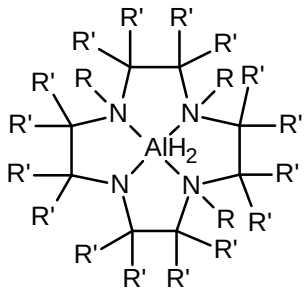
~~12.~~11. The process according to any of the claims 1 to 1~~1~~0, wherein the compound of general formula (I), (II), or (III) has a vapor pressure at least 1 mbar at a temperature of 200 °C.

~~13.~~12. The process according to any of the claims 1 to 1~~2~~1, wherein the inorganic metal- or semimetal-containing films contains less than 5 weight-% nitrogen.

~~14.~~13. Use of a compound of general formula (I), ~~(II),~~ or (III~~k~~)



(I)



(III~~k~~)

wherein A is NR, NR_2, PR, PR_2, O, OR, S, or SR,
n is 1, 2, or 3,
R is an alkyl group, an alkenyl group, an aryl group, or a silyl group and

R’ is hydrogen, an alkyl group, an alkenyl group, an aryl group, or a silyl group, and
A, and n are chosen such that the compound of general formula (I), (II), or (III) is electronically neutral,
wherein the compound of general formula (I) or (IIIk) has a molecular weight of not more than 500 g/mol,
as reducing agent in a vapor deposition process.

~~15.~~14. Use according to claim 1~~3~~4, wherein the vapor deposition process is an atomic layer deposition process.