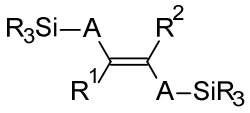
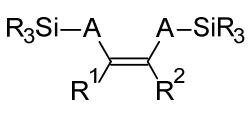
Claims

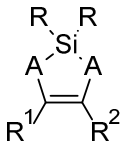
1. Process for preparing metal-containing films comprising
(a) depositing a metal-containing compound from the gaseous state onto a solid substrate and
(b) bringing the solid substrate with the deposited metal-containing compound in contact with a compound of general formula (Ia), (Ib), (Ic), (Id), (IIa), (IIb), (IIc), or (IId)



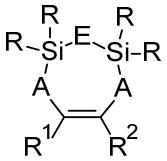
(Ia)



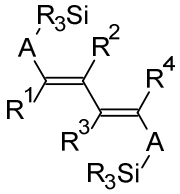
(Ib)



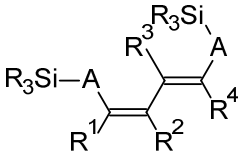
(Ic)



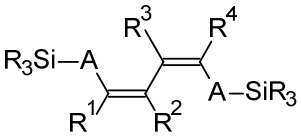
(Id)



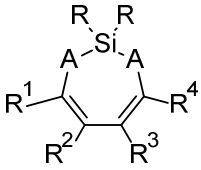
(IIa)



(IIb)



(IIc)



(IId)

wherein A is O or NR^N,
R and R^N is hydrogen, an alkyl group, an alkenyl group, an aryl group, or a silyl group,
R^1, R^2, R^3, and R^4 is hydrogen, an alkyl group, an alkenyl group, an aryl group, a silyl group, or an ester group, and
E is nothing, oxygen, methylene, ethylene, or 1,3-propylene.

2. The process according to claim 1, wherein R is hydrogen or methyl.

3. The process according to claim 1, wherein A is NR^N and R^N is an alkyl group or a silyl group.

4. The process according to claim 1 or 2, wherein A is NR^N and R^N is tert-butyl, neo-pentyl, 2,6-dimethylphenyl or trimethylsilyl.

5. The process according to any of the claims 1 to 4, wherein R^1, R^2, R^3 and R^4 are hydrogen, methyl, tert-butyl, trimethylsilyl or methylcarboxylate.

6. The process according to any of the claims 1 to 3, wherein the compound of general formula (Ia), (Ib), (Ic), (Id), (IIa), (IIb), (IIc), or (IId) has a molecular weight of not more than 600 g/mol.

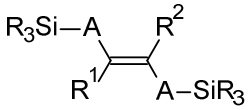
7. The process according to any of the claims 1 to 6, wherein the compound of general formula (Ia), (Ib), (Ic), (Id), (IIa), (IIb), (IIc), or (IId) has a vapor pressure of at least 0.1 mbar at 200 °C.

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

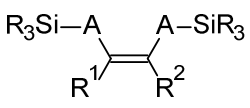
9. The process according to any of the claims 1 to 8, wherein the metal-containing compound contains Ti, Ta, Mn, Mo, W, or Al.

10. The process according to any of the claims 1 to 9, wherein the substrate is not heated to more than 350 ºC.

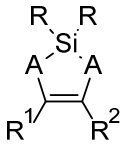
11. Use of a compound of general formula (Ia), (Ib), (Ic), (Id), (IIa), (IIb), (IIc), or (IId) as reducing agent in a film forming process,



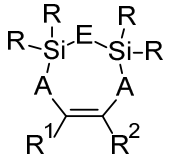
(Ia)



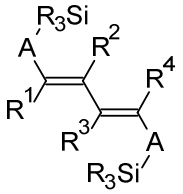
(Ib)



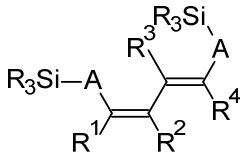
(Ic)



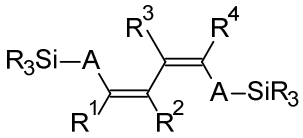
(Id)



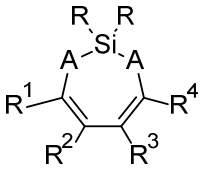
(IIa)



(IIb)



(IIc)



(IId)

wherein A is O or NR^N,
R and R^N is hydrogen, an alkyl group, an alkenyl group, an aryl group, or a silyl group,
R^1, R^2, R^3, and R^4 is hydrogen, an alkyl group, an alkenyl group, an aryl group, a silyl group, or an ester group, and
E is nothing, oxygen, methylene, ethylene, or 1,3-propylene.

12. A compound of general formula (Id), wherein A is O or NR^N,
R and R^N is hydrogen, an alkyl group, an alkenyl group, an aryl group, or a silyl group,
R^1 and R^2 is hydrogen or an alkyl group, and

E is nothing, oxygen, methylene, ethylene, or 1,3-propylene.

13. A compound of general formula (IIa), (IIb), (IIc) or (IId) wherein A is NR^N, R and R^N is hydrogen, an alkyl group, an alkenyl group, an aryl group, or a silyl group, R^1, R^2, R^3, and R^4 is hydrogen, an alkyl group, an alkenyl group, an aryl group, a silyl group, or in case of general formula (IIa), (IIb) or (IIc) an ester group.