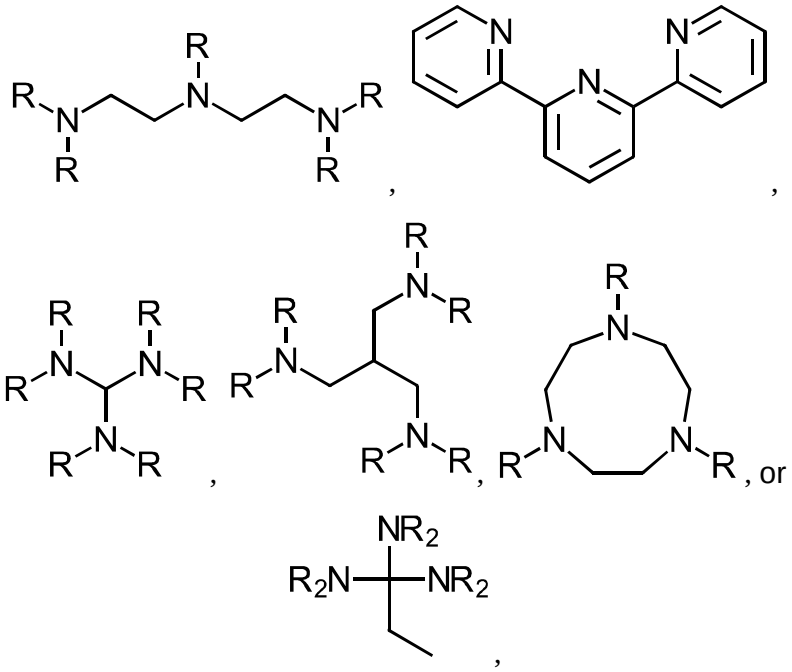
What is claimed is:

1. A metal coordination complex comprising molybdenum(0) and one or more tridentate ligand coordinated by nitrogen,

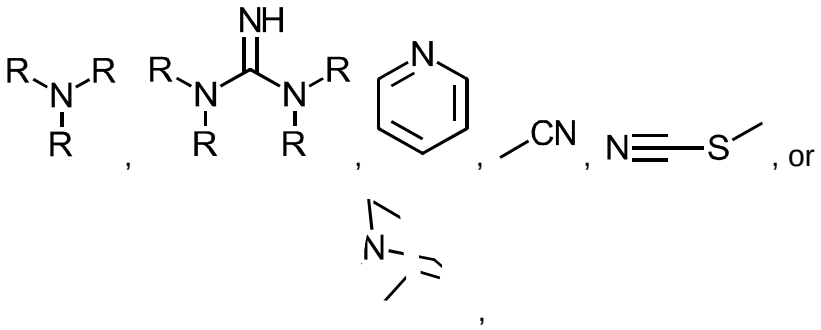
wherein the one or more tridentate ligand coordinated by nitrogen is selected from one or more of:



and wherein each R may be independently selected from Me-, Et-, iPr-, and tBu-.

2. The metal coordination complex of claim 1 further comprising one or more monodentate ligand coordinated by nitrogen.

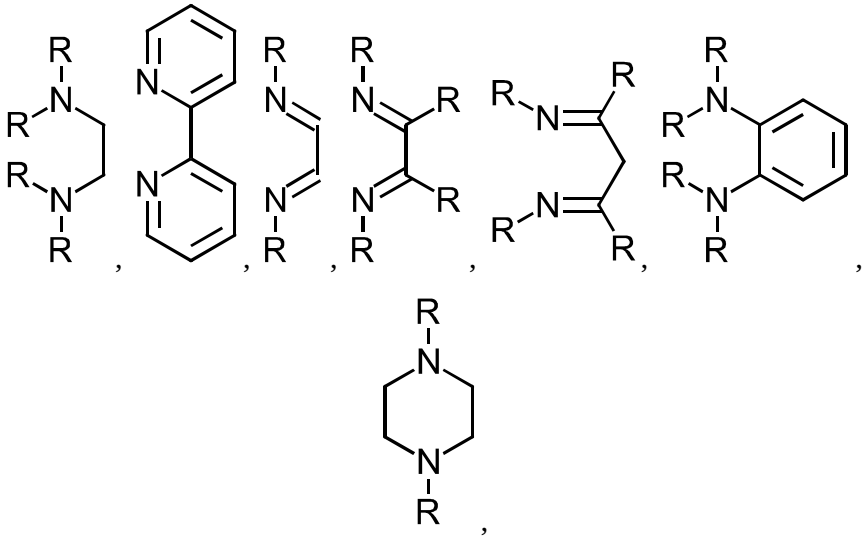
3. The metal coordination complex of claim 2, wherein the one or more monodentate ligand coordinated by nitrogen is selected from one or more of:

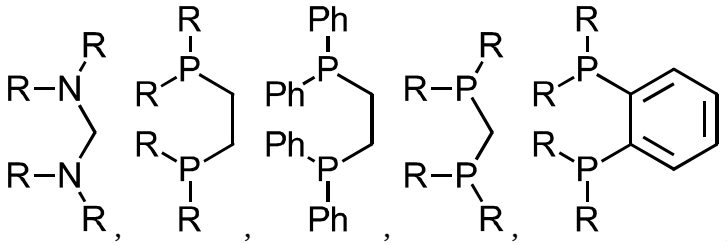


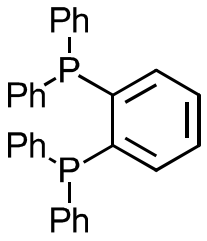
and wherein each R may be independently selected from Me-, Et-, iPr-, and tBu-.

4. The metal coordination complex of any one of claims 1 to 3 further comprising one or more bidentate ligand coordinated by nitrogen or phosphorous.

5. The metal coordination complex of claim 4, wherein the one or more bidentate ligand coordinated by nitrogen or phosphorous is selected from one or more of:



, , , or

,

and wherein each R may be independently selected from Me-, Et-, iPr-, and tBu-.

6. A method of depositing a film, the method comprising:

exposing a substrate to a molybdenum(0) precursor comprising the metal coordination complex of any one of claims 1 to 5; and

exposing the substrate to a reactant to react with the molybdenum(0) precursor to form a molybdenum film on the substrate.

7. The method of claim 6, wherein the molybdenum film comprises one or more of a molybdenum metal (elemental Mo) film, a molybdenum oxide film, a molybdenum carbide film, a molybdenum silicide film, and a molybdenum nitride film.

8. The method of claim 6, wherein the substrate is exposed to the molybdenum(0) precursor and the reactant sequentially.

9. The method of claim 6, wherein the substrate is exposed to the molybdenum(0) precursor and the reactant simultaneously.

10. The method of claim 6, further comprising purging the substrate of the molybdenum(0) precursor prior to exposing the substrate to the reactant.

11. The method of claim 10, further comprising purging the substrate of the reactant and repeating the method to provide a molybdenum film having a thickness in a range of from about 0.3 nm to about 100 nm.

12. A method of depositing a film, the method comprising:

forming a molybdenum-containing film in a process cycle comprising sequential exposure of a substrate to a molybdenum(0) precursor, purge gas, reactant, and purge gas, the molybdenum(0) precursor comprising the metal coordination complex of any one of claims 1 to 5.