CLAIMS

What is claimed is:

1. A mixture of $Mo(Ar^1)(Ar^2)$ compounds comprising about 60 mol % to about 95 mol % of EtBz ligand, wherein Ar^1 and Ar^2 are arene ligands and the mol% is based on the total moles of Ar^1 and Ar^2, wherein the compounds are liquid.

2. The mixture of $Mo(Ar^1)(Ar^2)$ compounds of claim 1, wherein the mixture further comprises about 0.25 mol % to about 13 mol % of Bz ligand and wherein a total amount ligand does not exceed 100 mol %.

3. The mixture of $Mo(Ar^1)(Ar^2)$ compounds of claim 1, wherein the mixture further comprises about 6.75 mol % to about 44.5 mol % of Et_2Bz ligand and wherein a total amount ligand does not exceed 100 mol %.

4. The mixture of $Mo(Ar^1)(Ar^2)$ compounds of claim 1, wherein the mixture further comprises about 0.75 mol % to about 7 mol % of Et_3Bz ligand and wherein a total amount ligand does not exceed 100 mol %.

5. The mixture of $Mo(Ar^1)(Ar^2)$ compounds of claim 1, wherein the mixture further comprises (i) about 0.25 mol % to about 13 mol % of Bz ligand, (ii) about 6.75 mol % to about 44.5 mol % of Et_2Bz ligand and (iii) about 0.75 mol % to about 7 mol % of Et_3Bz and wherein a total amount ligand does not exceed 100 mol %.

6. The mixture of $Mo(Ar^1)(Ar^2)$ compounds of claim 1, wherein the mixture of $Mo(Ar^1)(Ar^2)$ compounds has a viscosity of less than or equal to about 25 cP.

7. The mixture of $Mo(Ar^1)(Ar^2)$ compounds of claim 1, wherein the mixture of $Mo(Ar^1)(Ar^2)$ compounds has a viscosity of less than or equal to about 15 cP.

8. A mixture comprising $Mo(Ar^1)(Ar^2)$ compounds wherein

(i) Ar^1 and Ar^2 each comprises a different arene structure; and

(ii) Ar^1 and Ar^2 each have a same number of carbons and/or substantially the same molecular weight.

9. The mixture of claim 8, wherein the compounds are liquid within a temperature range of about 20 ^oC to about 35 ^oC.

10. The mixture of claim 8, wherein at least one of Ar^1 and Ar^2 comprises one or more substituent selected from an unsubstituted linear C_1-C_6 alkyl group, a linear C_1-C_6 alkyl group substituted with a halogen, a linear C_1-C_6 alkyl group substituted with an amino group, an unsubstituted branched C_3-C_6

alkyl group, a branched C_3-C_6 alkyl group substituted with a halogen, or a branched C_3-C_6 alkyl group substituted with an amino group, an unsubstituted amine, or a substituted amine.

11. The mixture of claim 8, wherein at least one of Ar^1 and Ar^2 comprises one or more substituent that is an unsubstituted linear C_1-C_3 alkyl group.

12. The mixture of claim 8, wherein at least one of Ar^1 and Ar^2 comprises one or more methyl group.

13. The mixture of claim 8, wherein at least one of Ar^1 and Ar^2 comprises one or more ethyl group.

14. The mixture of claim 8, wherein at least one of Ar^1 and Ar^2 comprises one or more propyl group.

15. The mixture of claim 8, wherein one of Ar^1 and Ar^2 is EtBz and the other of Ar^1 and Ar^2 is Me_2Bz.

16. The mixture of claim 8, wherein one of Ar^1 and Ar^2 is EtBz and the other of Ar^1 and Ar^2 is meta-Me_2Bz.

17. The mixture of claim 8, wherein the mixture comprising $Mo(Ar^1)(Ar^2)$ compounds has a viscosity of less than or equal to about 25 cP.

18. The mixture of claim 8, wherein the mixture comprising $Mo(Ar^1)(Ar^2)$ compounds has a viscosity of less than or equal to about 15 cP.

19. The mixture of claim 8, wherein Ar^1 and Ar^2 have the same number of carbons.

20. The mixture of claim 19, wherein Ar^1 and Ar^2 have substantially the same molecular weight.

21. The mixture of claim 19, wherein Ar^1 and Ar^2 have the same molecular weight.

22. The mixture of $Mo(Ar^1)(Ar^2)$ compounds of claim 1, wherein the mixture is substantially free of chloride ions.

23. The mixture of claim 8, wherein the mixture is substantially free of chloride ions.

24. A method for forming a transition metal-containing film on at least one surface of a substrate comprising:

a. providing the at least one surface of the substrate in a reaction vessel;

b. forming a transition metal-containing film on the at least one surface by chemical vapor deposition (CVD) or an atomic layer deposition (ALD) process using one or more of the mixtures of any of claims 1-23.