CLAIMS

1. A method of making a metal organic framework (MOF) comprising reacting a metal ion and an at least bidentate organic ligand, wherein the metal ion and the organic ligand are selected to provide a deliverable adsorption capacity of at least 70 g/l for an electronic gas;

wherein the electronic gas is selected from a group consisting of hydride gases, halide gases, and organometallic Group V gaseous compounds.

2. The method of claim 1, wherein the deliverable adsorption capacity is 70 to 840 g/l for the electronic gas.

3. The method of claim 1, wherein the electronic gas is selected from a group consisting of ammonia, arsine, boron trichloride, boron trifluoride, diborane, dichlorosilane, dichlorosilane, difluoromethane, disilane, fluorine, germane, germanium tetrafluoride, hexafluoroethane, hydrogen bromide, hydrogen chloride, hydrogen fluoride, hydrogen selenide, hydrogen telluride, hydrogen sulfide, methyl fluoride, methyl silane, nitrogen trifluoride, perfluoropropane, phosphine, silane, silicon tetrachloride, tetrafluoromethane, tetramethylsilane, silicon tetrafluoride, stibine, sulfur hexafluoride, trichlorosilane, trifluoromethane, trimethylsilane, tungsten hexafluoride and acetylene.

4. A method of making a metal organic framework (MOF) comprising reacting a metal ion and an at least bidentate organic ligand, wherein the metal ion and the organic ligand are selected to provide a deliverable adsorption capacity of at least 70 g/l for an electronic gas, wherein the metal ion is selected from Li+, Na+, K+, Rb+, Be2+, Mg2+, Ca2+, Sr2+, Ba2+, Sc3+, Y3+, Ti4+, Zr4+, Hf4+, V5+, V4+, V3+, Nb3+, Ta3+, Cr3+, Cr2+, Mo3+, W3+, Mn3+, Fe3+, Fe2+, Ru3+, Ru2+, Os3+, Os2+, Co3+, Co2+, Ni2+, Ni+, Pd2+, Pd+, Pt2+, Pt+, Cu2+, Cu+, Ag+, Au+, Zn2+, Al3+, Ga3+, In3+, Si4+, Si2+, Ge4+, Ge2+, Sn4+, Sn2+, Bi5+, Bi3+, Cd2+, Mn2+, Tb3+, Gd3+, Ce3+, La3+ and Cr4+, and combinations thereof.

5. The method of claim 1, wherein the electronic gas comprises arsine and the at least bidentate organic ligand is selected from terephthalic acid and/or 1,4-diazabicyclo[2.2.2]octane (DABCO).

6. A method of making a metal organic framework (MOF) comprising reacting a metal ion and an at least bidentate organic ligand, wherein the metal ion and the organic ligand are selected to provide a deliverable adsorption capacity of at least 70 g/l for an electronic gas, wherein:

the MOF comprises a gravimetric surface area between 1,000 and 14,500 m^2/g, a pore volume between 1 and 3 cm^2/g, and an average pore size between 3Å and 32 Å; and

the electronic gas comprises boron trifluoride; and

the at least bidentate organic ligand comprises trimesic acid.

7. A method of making a metal organic framework (MOF) comprising reacting a metal ion and an at least bidentate organic ligand, wherein the metal ion and the organic ligand are selected to provide a deliverable adsorption capacity of at least 70 g/l for an electronic gas, wherein the MOF is formed into pellets, disks or a monolithic body.

8. A metal organic framework (MOF) comprising the coordination product of a metal ion and an at least bidentate organic ligand, wherein the metal ion and the organic ligand are selected to store an electronic gas other than arsine, phosphine, boron trifluoride, or germanium tetrafluoride, wherein the electronic gas is selected from a group consisting of hydride gases, halide gases, and organometallic Group V gaseous compounds.

9. The MOF of claim 8, wherein the electronic gas is selected from a group consisting of ammonia, boron trichloride, diborane, dichlorosilane, dichlorosilane, difluoromethane, disilane, fluorine, germane, hexafluoroethane, hydrogen bromide, hydrogen chloride, hydrogen fluoride, hydrogen selenide, hydrogen telluride, hydrogen sulfide, methyl fluoride, methyl silane, nitrogen trifluoride, perfluoropropane, silane, silicon tetrachloride, tetrafluoromethane, tetramethylsilane, silicon tetrafluoride, stibine, sulfur hexafluoride, trichlorosilane, trifluoromethane, trimethylsilane, tungsten hexafluoride and acetylene.

10. A gas storage and dispensing apparatus comprising a tank filled with the MOF of claim 8.

11. The apparatus of claim 10, wherein the apparatus comprises a MOF pellet filled tank.

12. The apparatus of claim 10, wherein the apparatus comprises a MOF disk filled tank.

13. The apparatus of claim 10, wherein the apparatus comprises a monolithic MOF filled tank.

14. The method of claim 4, wherein the deliverable adsorption capacity is 70 to 840 g/l for the electronic gas.

15. The method of claim 4, wherein the electronic gas is selected from a group consisting of ammonia, arsine, boron trichloride, boron trifluoride, carbonyl sulfide, chlorine, deuterium, diborane, dichlorosilane, dichlorosilane, difluoromethane, disilane, fluorine, germane, germanium tetrafluoride, hexafluoroethane, hydrogen bromide, hydrogen chloride, hydrogen fluoride, hydrogen selenide, hydrogen telluride, hydrogen sulfide, methyl fluoride, methyl silane, neon, nitric organic, nitrogen trifluoride, perfluoropropane, phosphine, silane, silicon tetrachloride, tetrafluoromethane, tetramethylsilane, silicon tetrafluoride, stibine, sulfur hexafluoride, trichlorosilane, trifluoromethane, trimethylsilane, tungsten hexafluoride, acetylene, and organometallic gaseous reagents.

16. The method of claim 4, wherein the electronic gas comprises arsine and the at least bidentate organic ligand is selected from terephthalic acid and/or 1,4-diazabicyclo[2.2.2]octane (DABCO).

17. The method of claim 6, wherein the deliverable adsorption capacity is 70 to 840 g/l for the electronic gas.

18. The method of claim 6, wherein the electronic gas is selected from a group consisting of ammonia, arsine, boron trichloride, boron trifluoride, carbonyl sulfide, chlorine, deuterium, diborane, dichlorosilane, dichlorosilane, difluoromethane, disilane, fluorine, germane, germanium tetrafluoride, hexafluoroethane, hydrogen bromide, hydrogen chloride, hydrogen fluoride, hydrogen selenide, hydrogen telluride, hydrogen sulfide, methyl fluoride, methyl silane, neon, nitric organic, nitrogen trifluoride, perfluoropropane, phosphine, silane, silicon tetrachloride, tetrafluoromethane, tetramethylsilane, silicon tetrafluoride, stibine, sulfur

hexafluoride, trichlorosilane, trifluoromethane, trimethylsilane, tungsten hexafluoride, acetylene, and organometallic gaseous reagents.

19. The method of claim 6, wherein the electronic gas comprises arsine and the at least bidentate organic ligand is selected from terephthalic acid and/or 1,4-diazabicyclo[2.2.2]octane (DABCO).

20. The method of claim 7, wherein the deliverable adsorption capacity is 70 to 840 g/l for the electronic gas.

21. The method of claim 7, wherein the electronic gas is selected from a group consisting of ammonia, arsine, boron trichloride, boron trifluoride, carbonyl sulfide, chlorine, deuterium, diborane, dichlorosilane, dichlorosilane, difluoromethane, disilane, fluorine, germane, germanium tetrafluoride, hexafluoroethane, hydrogen bromide, hydrogen chloride, hydrogen fluoride, hydrogen selenide, hydrogen telluride, hydrogen sulfide, methyl fluoride, methyl silane, neon, nitric organic, nitrogen trifluoride, perfluoropropane, phosphine, silane, silicon tetrachloride, tetrafluoromethane, tetramethylsilane, silicon tetrafluoride, stibine, sulfur hexafluoride, trichlorosilane, trifluoromethane, trimethylsilane, tungsten hexafluoride, acetylene, and organometallic gaseous reagents.

22. The method of claim 7, wherein the electronic gas comprises arsine and the at least bidentate organic ligand is selected from terephthalic acid and/or 1,4-diazabicyclo[2.2.2]octane (DABCO).