WHAT IS CLAIMED IS:

1. A conjugated molecule that is *p-tert*-butylthiophenyl-nonafluorobiphenyl; *tert*-butylthiophenyl-4-(2',5'-dimethoxyphenyl)-tetrafluorobenzene; 4-pentafluorophenyl-4'-*tert*-butylthio-2,5-dimethoxybiphenyl; 4-pentafluorophenyl-4'-(*p-tert*-butylthio)phenyl-2,2',5',5'-tetramethoxybiphenyl; 1-*tert*-butylthiophenyl-4-(2',2'',5',5''-tetramethoxybiphenyl)-tetrafluorobenzene; 4-(2',5'-dimethoxy-4'-*tert*-butylthiophenyl)phenyl-nonafluorobiphenyl; 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl; *p*-acetylthiophenyl-nonafluorobiphenyl; acetylthiophenyl-4-2',5'-dimethoxyphenyl-tetrafluorobenzene; 4-pentafluorophenyl-4'-acetylthio-2,5-dimethoxybiphenyl; 1-*tert*-acetylthiophenyl-4-2',2'',5',5''-tetramethoxybiphenyl-tetrafluorobenzene; 4-(2',5'-dimethoxy-4'-acetylthiophenyl)phenyl-nonafluorobiphenyl; 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl; 4'-*tert*-butylthio-biphenyl-nonafluorobiphenyl-4-yl methane; 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl ether; 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl sulfide; 4'-acetyllthio-biphenyl-nonafluorobiphenyl-4-yl methane; 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl ether; or 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl sulfide.

2. The conjugated molecule of claim 1 that is *p-tert*-butylthiophenyl-nonafluorobiphenyl.

3. The conjugated molecule of claim 1 that is *tert*-butylthiophenyl-4-(2',5'-dimethoxyphenyl)-tetrafluorobenzene.

4. The conjugated molecule of claim 1 that is 4-pentafluorophenyl-4'-*tert*-butylthio-2,5-dimethoxybiphenyl.

5. The conjugated molecule of claim 1 that is 4-pentafluorophenyl-4'-(*p-tert*-butylthio)phenyl-2,2',5,5'-tetramethoxybiphenyl.

6. The conjugated molecule of claim 1 that is 1-*tert*-butylthiophenyl-4-(2',2'',5',5''-tetramethoxybiphenyl)-tetrafluorobenzene.

7. The conjugated molecule of claim 1 that is 4-(2',5'-dimethoxy-4'-*tert*-butylthiophenyl)phenyl-nonafluorobiphenyl.

8. The conjugated molecule of claim 1 that is 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl.

9. The conjugated molecule of claim 1 that is *p*-acetylthiophenyl-nonafluorobiphenyl.

10. The conjugated molecule of claim 1 that is acetylthiophenyl-4-2',5'-dimethoxyphenyl-tetrafluorobenzene.

11. The conjugated molecule of claim 1 that is 4-pentafluorophenyl-4'-acetylthio-2,5-dimethoxybiphenyl.

12. The conjugated molecule of claim 1 that is 1-*tert*-acetylthiophenyl-4-2',2'',5',5''-tetramethoxybiphenyl-tetrafluorobenzene.

13. The conjugated molecule of claim 1 that is 4-(2',5'-dimethoxy-4'-acetylthiophenyl)phenyl-nonafluorobiphenyl.

14. The conjugated molecule of claim 1 that is 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl.

15. The conjugated molecule of claim 1 that is 4'-*tert*-butylthio-biphenyl-nonafluorobiphenyl-4-yl methane.

16. The conjugated molecule of claim 1 that is 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl ether.

17. The conjugated molecule of claim 1 that is 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl sulfide.

18. The conjugated molecule of claim 1 that is 4'-acetyllthio-biphenyl-nonafluorobiphenyl-4-yl methane.

19. The conjugated molecule of claim 1 that is 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl ether.

20. The conjugated molecule of claim 1 that is 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl sulfide.

~~2.~~21. A molecular electronic device, comprising a first electrical contact, a second electrical contact, and the conjugated molecule of any one of claims 1 to 20 forming a conductive path between the first electrical contact and the second electrical contact, wherein the second electrical contact is connected to the conjugated molecule through the thio moiety of the conjugated molecule.

~~3.~~22. The molecular electronic device of claim 21 wherein the first electrical contact and the second electrical contact are each independently composed of gold, silver, copper, platinum, palladium, indium tin oxide or a conductive polymer.

~~4.~~23. The molecular electronic device of claim 21 or claim ~~3~~ 22 wherein the first electrical contact and the second electrical contact are each layered on a solid substrate.

~~5.~~24. The molecular electronic device of any one of claims 21 to ~~4~~ 23 wherein the solid substrate is silicon, mica, polyethylene terephthalate or polycarbonate.

~~6.~~25. The molecular electronic device of any one of claims 21 to ~~5~~ 24 wherein the conjugated molecule is a plurality of conjugated molecules.

~~7.~~26. The molecular electronic device of claim ~~6~~ 25 wherein the plurality of conjugated molecules forms a monolayer.

~~8.~~27. A method of manufacturing the molecular electronic device of any one of claims ~~2~~ 21 to ~~7~~26, comprising contacting the first electrical contact with a solution containing the conjugated molecule of any one of claims 1 to 20 to form a monolayer of conjugated molecule on the first electrical contact, the first electrical contact contacting the thio moiety of the conjugated molecule; and depositing a second electrical contact on the monolayer of conjugated molecule, the second electrical contact contacting the end of the conjugated molecule not having the thio moiety.

~~9.~~28. A crossbar device comprising a first conductor and a second conductor that intersects the first conductor at a non-zero angle and the molecular electronic device of any one of claims 21 to ~~7~~26, wherein the molecular electronic device connects the first conductor and the second conductor at the point of intersection.

WHAT IS CLAIMED IS:

1. A conjugated molecule that is *p-tert*-butylthiophenyl-nonafluorobiphenyl; *tert*-butylthiophenyl-4-(2',5'-dimethoxyphenyl)-tetrafluorobenzene; 4-pentafluorophenyl-4'-*tert*-butylthio-2,5-dimethoxybiphenyl; 4-pentafluorophenyl-4'-(*p-tert*-butylthio)phenyl-2,2',5,5'-tetramethoxybiphenyl; 1-*tert*-butylthiophenyl-4-(2',2'',5',5''-tetramethoxybiphenyl)-tetrafluorobenzene; 4-(2',5'-dimethoxy-4'-*tert*-butylthiophenyl)phenyl-nonafluorobiphenyl; 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl; *p*-acetylthiophenyl-nonafluorobiphenyl; acetylthiophenyl-4-2',5'-dimethoxyphenyl-tetrafluorobenzene; 4-pentafluorophenyl-4'-acetylthio-2,5-dimethoxybiphenyl; 1-*tert*-acetylthiophenyl-4-2',2'',5',5''-tetramethoxybiphenyl-tetrafluorobenzene; 4-(2',5'-dimethoxy-4'-acetylthiophenyl)phenyl-nonafluorobiphenyl; 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl; 4'-*tert*-butylthio-biphenyl-nonafluorobiphenyl-4-yl methane; 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl ether; 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl sulfide; 4'-acetyllthio-biphenyl-nonafluorobiphenyl-4-yl methane; 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl ether; or 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl sulfide.

2. The conjugated molecule of claim 1 that is *p-tert*-butylthiophenyl-nonafluorobiphenyl.

3. The conjugated molecule of claim 1 that is *tert*-butylthiophenyl-4-(2',5'-dimethoxyphenyl)-tetrafluorobenzene.

4. The conjugated molecule of claim 1 that is 4-pentafluorophenyl-4'-*tert*-butylthio-2,5-dimethoxybiphenyl.

5. The conjugated molecule of claim 1 that is 4-pentafluorophenyl-4'-(*p-tert*-butylthio)phenyl-2,2',5,5'-tetramethoxybiphenyl.

6. The conjugated molecule of claim 1 that is 1-*tert*-butylthiophenyl-4-(2',2'',5',5''-tetramethoxybiphenyl)-tetrafluorobenzene.

7. The conjugated molecule of claim 1 that is 4-(2',5'-dimethoxy-4'-*tert*-butylthiophenyl)phenyl-nonafluorobiphenyl.

8. The conjugated molecule of claim 1 that is 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl.

9. The conjugated molecule of claim 1 that is *p*-acetylthiophenyl-nonafluorobiphenyl.

10. The conjugated molecule of claim 1 that is acetylthiophenyl-4-2',5'-dimethoxyphenyl-tetrafluorobenzene.

11. The conjugated molecule of claim 1 that is 4-pentafluorophenyl-4'-acetylthio-2,5-dimethoxybiphenyl.

12. The conjugated molecule of claim 1 that is 1-*tert*-acetylthiophenyl-4-2',2'',5',5''-tetramethoxybiphenyl-tetrafluorobenzene.

13. The conjugated molecule of claim 1 that is 4-(2',5'-dimethoxy-4'-acetylthiophenyl)phenyl-nonafluorobiphenyl.

14. The conjugated molecule of claim 1 that is 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl.

15. The conjugated molecule of claim 1 that is 4'-*tert*-butylthio-biphenyl-nonafluorobiphenyl-4-yl methane.

16. The conjugated molecule of claim 1 that is 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl ether.

17. The conjugated molecule of claim 1 that is 4'-*tert*-butylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl sulfide.

18. The conjugated molecule of claim 1 that is 4'-acetyllthio-biphenyl-nonafluorobiphenyl-4-yl methane.

19. The conjugated molecule of claim 1 that is 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl ether.

20. The conjugated molecule of claim 1 that is 4'-acetylthio-biphenyl-4-yl-nonafluorobiphenyl-4-yl sulfide.

21. A molecular electronic device, comprising a first electrical contact, a second electrical contact, and the conjugated molecule of any one of claims 1 to 20 forming a conductive path between the first electrical contact and the second electrical contact, wherein the second electrical contact is connected to the conjugated molecule through the thio moiety of the conjugated molecule.

22. The molecular electronic device of claim 21 wherein the first electrical contact and the second electrical contact are each independently composed of gold, silver, copper, platinum, palladium, indium tin oxide or a conductive polymer.

23. The molecular electronic device of claim 21 or claim 22 wherein the first electrical contact and the second electrical contact are each layered on a solid substrate.

24. The molecular electronic device of any one of claims 21 to 23 wherein the solid substrate is silicon, mica, polyethylene terephthalate or polycarbonate.

25. The molecular electronic device of any one of claims 21 to 24 wherein the conjugated molecule is a plurality of conjugated molecules.

26. The molecular electronic device of claim 25 wherein the plurality of conjugated molecules forms a monolayer.

27. A method of manufacturing the molecular electronic device of any one of claims 21 to 26, comprising contacting the first electrical contact with a solution containing the conjugated molecule of any one of claims 1 to 20 to form a monolayer of conjugated molecule on the first electrical contact, the first electrical contact contacting the thio moiety of the conjugated molecule; and depositing a second electrical contact on the monolayer of conjugated molecule, the second electrical contact contacting the end of the conjugated molecule not having the thio moiety.

28. A crossbar device comprising a first conductor and a second conductor that intersects the first conductor at a non-zero angle and the molecular electronic device of any one of claims 21 to 26, wherein the molecular electronic device connects the first conductor and the second conductor at the point of intersection.