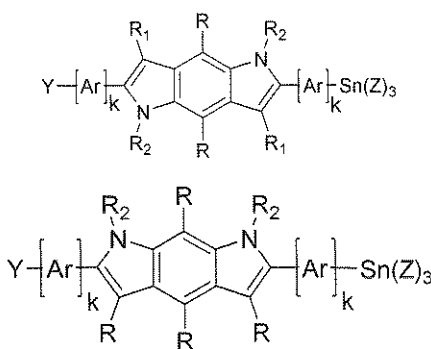
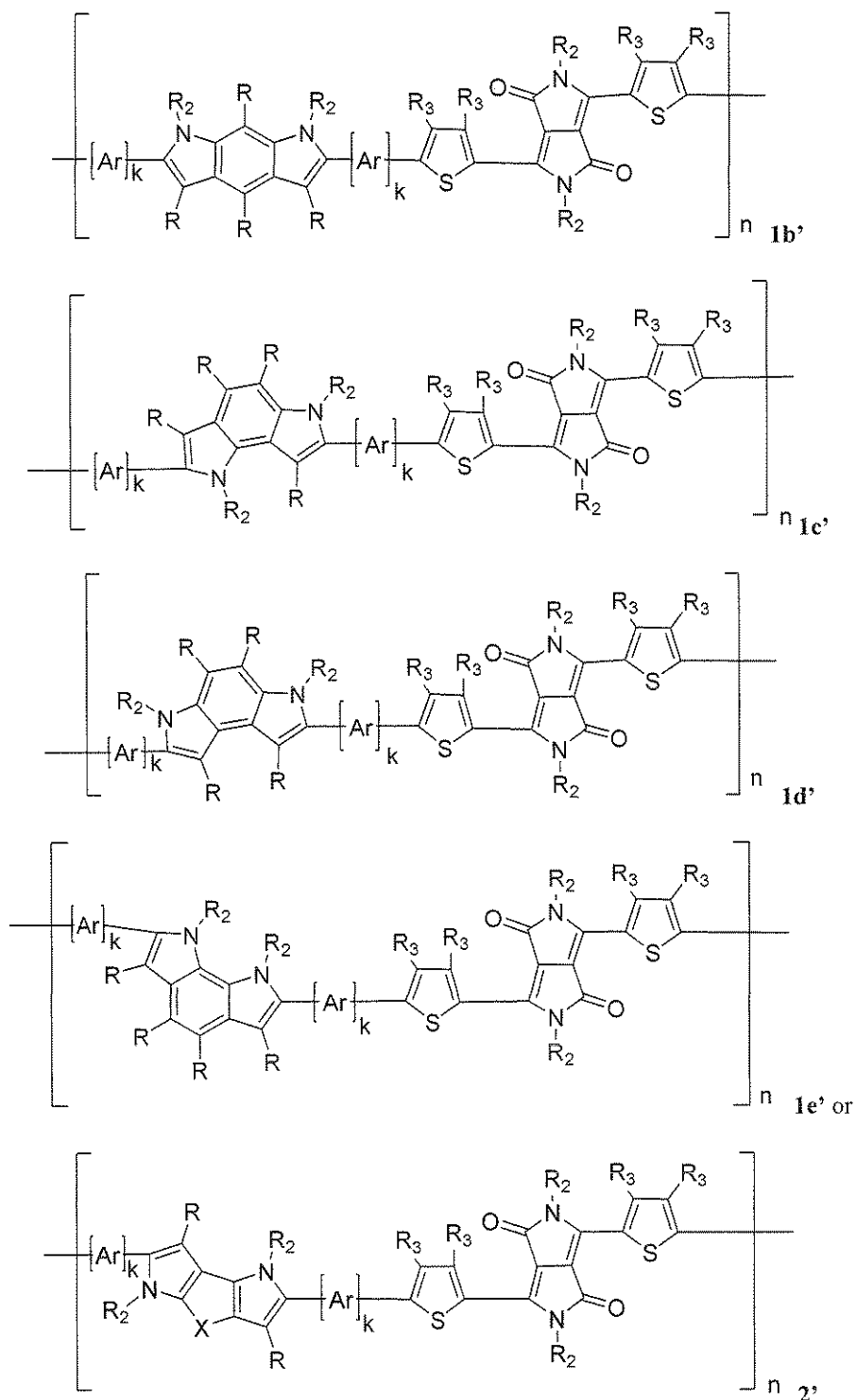


7. The compound of any of claims 1-~~54~~, wherein Ar is an optionally substituted aryl or heteroaryl.
8. The compound of any of claims 1-~~54~~, wherein Ar is a thiophene or fused thiophene.
9. The compound of claim 8, wherein the thiophene or fused thiophene is bonded to compound via the α positions and optionally substituted with one or more C_1 - C_{20} alkyl groups at the β positions.
10. The compound of any of claims 1-~~94~~, wherein X is N, S, or O.
11. The compound of any of claims 1-~~104~~, wherein Y is H, optionally substituted alkyl, or halo.
12. The compound of any of claims 1-~~114~~, wherein each R_1 and R_3 are independently H, optionally substituted alkyl, halo, optionally substituted alkoxy, optionally substituted alkylthiol, or optionally substituted alkenyl.
13. The compound of claim 12, wherein each R and R_2 are independently H, optionally substituted alkyl, halo, or optionally substituted alkoxy.
14. A method of making a compound of any of claims 1-~~134~~, the method comprising reacting a compound of structure:





wherein n is an integer greater than zero; Ar is an optionally substituted aromatic or heteroaromatic group or conjugated group; k is an integer from 0 to 5 with the proviso that when k is 0, the structure results in a direct bond between the thiophene and pyrrole group; each X is independently NR₁, PR₁, AsR₁, Sb, O, S, Te, or Se, with the proviso that due to conjugation, X may be bonded to one or more additional R₁; each Y

is independently H, halo, trialkylsilane, optionally substituted C₁-C₄₀ alkyl, optionally substituted aralkyl, alkoxy, alkylthio, optionally substituted C₂-C₄₀ alkenyl, optionally substituted C₂-C₄₀ alkynyl, aminocarbonyl, acylamino, acyloxy, aryl, aryloxy, optionally substituted amino, carboxyalkyl, optionally substituted cycloalkyl, optionally substituted cycloalkenyl, halo, acyl, optionally substituted heteroaryl, optionally substituted heteroaralkyl, heteroaryloxy, optionally substituted heterocyclyl, thiol, alkylthio, heteroarylthiol, optionally substituted sulfoxide, optionally substituted sulfone, OSO-alkyl, Mg halo, Zn halo, Sn(alkyl)₃, SnH₃, B(OH)₂, B(alkoxy)₂, or OTs; and each R, R₁, R₂, and R₃ is independently H, halo, optionally substituted C₁-C₄₀ alkyl, optionally substituted aralkyl, alkoxy, alkylthio, optionally substituted C₂-C₄₀ alkenyl, optionally substituted C₂-C₄₀ alkynyl, aminocarbonyl, acylamino, acyloxy, optionally substituted aryl, aryloxy, optionally substituted amino, carboxyalkyl, optionally substituted cycloalkyl, optionally substituted cycloalkenyl, acyl, optionally substituted heteroaryl, optionally substituted heteroaralkyl, heteroaryloxy, optionally substituted heterocyclyl, thiol, alkylthio, heteroarylthiol, optionally substituted sulfoxide, or optionally substituted sulfone.

16. The polymer of claim 15, wherein n is an integer from 1 to 500.
17. The polymer of claim 16, wherein n is an integer from 3 to 20.
18. The polymer of any of claims 15-17, wherein the compound comprises structure 1a' or 1b'.
19. The polymer of any of claims 15-17, wherein the compound comprises structure 1c', 1d', or 1e'.
20. The polymer of any of claims 15-17, wherein the compound comprises structure 2'.
21. The polymer of any of claims 15-2017, wherein k is from 0-3.
22. The polymer of claim 21, wherein k is 0.

23. The polymer of any of claims 15-~~22~~17, wherein Ar is an optionally substituted aryl or heteroaryl.
24. The polymer of claim 23, wherein Ar is a thiophene or fused thiophene.
25. The polymer of claim 24, wherein the thiophene or fused thiophene is bonded to compound via the α positions and optionally substituted with one or more C_1 - C_{20} alkyl groups at the β positions.
26. The polymer of any of claims 15-~~25~~17, wherein X is N, S, or O.
27. The polymer of any of claims 15-~~26~~17, wherein ~~$\forall$ X is NH~~ and Ar is an optionally substituted ~~alkyl, or haloaryl or heteroaryl~~.
28. The polymer of any of claims 15-~~27~~17, wherein each R_1 and R_3 are independently H, optionally substituted alkyl, halo, optionally substituted alkoxy, optionally substituted alkylthiol, or optionally substituted alkenyl.
29. The polymer of claim 28, wherein each R and R_2 are independently H, optionally substituted alkyl, halo, or optionally substituted alkoxy.
30. A method of making the polymer of any of claims 15-~~29~~17, the method comprising reacting one or more compounds of formula:

