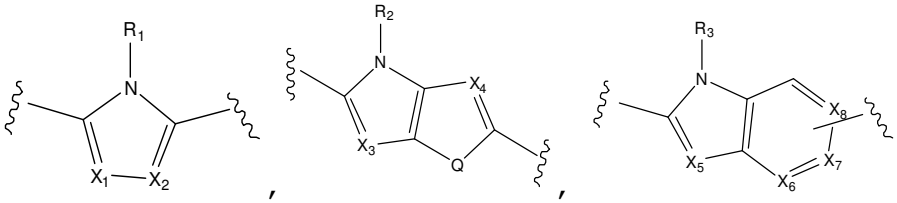
Claims

1. Compounds of the general formula I:

$$EWG1 -(T1)_a-(T2)_b-(Z)_c-(T3)_d-(T4)_e-EWG2$$

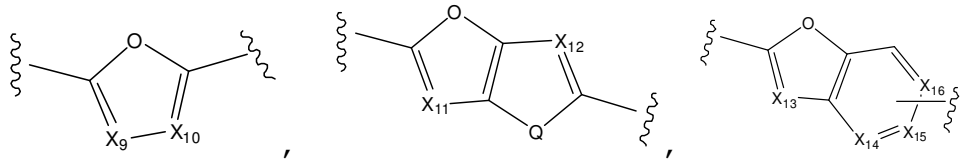
- with the parameters a, b, d and e being each independently of one another 0 or 1,
- with the parameter c being 1, 2, 3, 4 or 5,
- where the general group Z is a block of two groups M and N, linked as *–M–N–* or *–N–M–*, where * designates the attachment to the groups T1 to T4 or EWG1 and EWG2,
- where the groups M each independently of one another are selected from:

Formula 1 Formula 2 Formula 3



- where the groups N each independently of one another are selected from:

Formula 4 Formula 5 Formula 6



- where M and N are each linked such that at least one N atom of the group M and one O atom of the group N are each joined to one another via 2 C atoms, and ≀ designates the attachment to the other groups in the compound of the general formula I,
- with X_1–X_{16} independently of one another being selected from N or C–R, with the proviso that in the groups of the formulae 3 and 6, in each case one group from the groups X_8/X_7 and X_{16}/X_{15} designates the attachment ≀ to the other groups in the compound of the general formula I,

- with each R independently of any other being selected from a group composed of H, halogen, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, where hydrogen atoms of the C_1–C_{20} alkyl may be substituted and C atoms of the C_1–C_{20} alkyl may be replaced by heteroatoms; C_2–C_{20} alkenyl, O-alkyl, S-alkyl, O-alkenyl, S-alkenyl, alkynyl, aryl, heteroaryl, it being possible for hydrogen atoms to be substituted in all of these groups; CN, NR'R'', with R' and R'' each independently of one another being selected from: H, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, where hydrogen atoms of the C_1–C_{20} alkyl may be substituted and C atoms of the C_1–C_{20} alkyl may be replaced by heteroatoms,

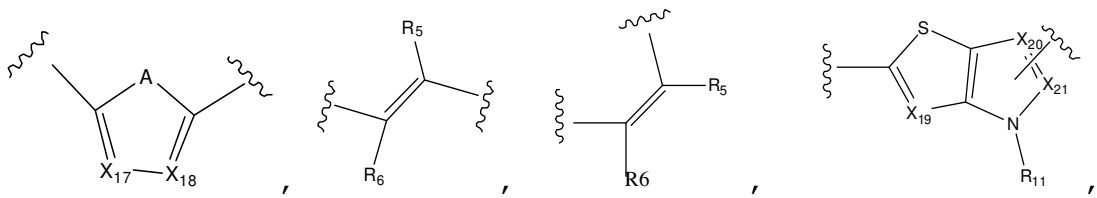
- where R_1 to R_3 each independently of one another are selected from a group composed of H, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, where hydrogen atoms of the C_1–C_{20} alkyl may be substituted and C atoms of the C_1–C_{20} alkyl may be replaced by heteroatoms; substituted or unsubstituted C_2–C_{20} alkenyl, substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl, CN,

- with each Q independently of any other being selected from S, O, Se, NR''', where R''' is defined as for R_1 to R_3,

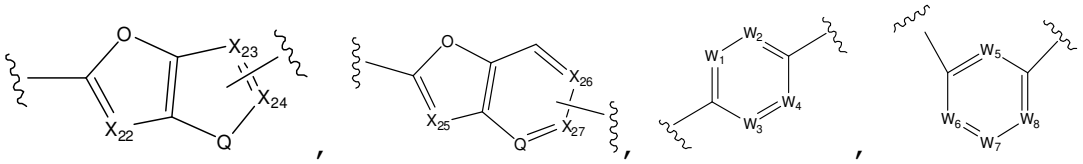
- where the electron-withdrawing groups EWG1 and EWG2 independently of one another are electron-withdrawing groups having at least one C=C double bond,

- where the groups T1, T2, T3 and T4 each independently of one another are selected from:

Formula 10 Formula 11 Formula 11* Formula 12



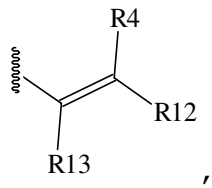
Formula 13 Formula 14 Formula 15 Formula 16

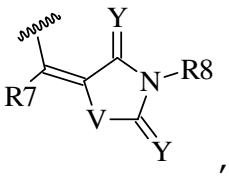


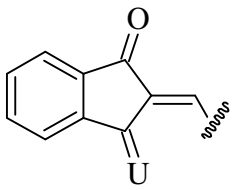
- and ≀ designates the attachment to the other groups in the compound of the general formula I,
- with R5 and R6 each independently of one another being selected from a group: H, CN, F, aryl, heteroaryl, C_2–C_{20} alkenyl, alkynyl, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, where hydrogen atoms of the C_1–C_{20} alkyl may be substituted, where, if the substituent R_{13} is present in the compound of the formula I, a ring closure between R_5 with R_{13} or R_6 with R_{13} is possible, with the proviso that between R_5 and R_{13} or between R_6 and R_{13} in each case the double bond from formula 11 is located, is possible,
- with W_1 to W_8 each independently of one another being selected from N, CR, where R is defined as described above,
- with X_{17} to X_{27} independently of one another being selected from C–R, where R is defined as described above, and with the proviso that in the groups of the formulae 12, 13 and 14, in each case one group from the groups X_{20}/X_{21}, X_{23}/X_{24} and X_{26}/X_{27} designates the attachment ≀ to the other groups in the compound of the general formula I,
- with A being S, O, NR'''', Se
- with Q being S, O, NR'''', Se
- where for the groups A and Q, the substituent R'''' in each case independently of any other is selected from H, CN, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, where the H atoms of the C_1–C_{20} alkyl may be substituted; C_2–C_{20} alkenyl, O-alkyl, S-alkyl, O-alkenyl, S-alkenyl, alkynyl, substituted or unsubstituted aryl, substituted or unsubstituted heteroaryl.

2. The compounds of the formula I as claimed in claim 1, where the electron-withdrawing groups EWG1 and EWG2 independently of one another are selected from:

Formula 7 Formula 8 Formula 9



,


,


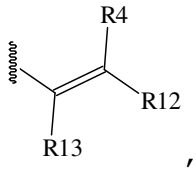
and ⌇ designates the attachment to the groups T1 to T4 or Z in the compound of the general formula I,

- with R_4 and R_{12} each independently of one another being selected from H, CN, COOR, with the proviso that R_4 and R_{12} cannot both be H,
- where R is selected from the same group of compounds as defined in the case of R_1 to R_3,
- with each R_{13} independently of any other being selected from a group: H, CN, F, aryl, heteroaryl, C_2–C_{20} alkenyl, alkynyl, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, where hydrogen atoms of the C_1–C_{20} alkyl may be substituted, where, if the substituent R_5 or R_6 is present in the compound of the formula I, a ring closure between R_5 with R_{13} or R_6 with R_{13} is possible, with the proviso that the double bond from formula 11 is located in each case between R_5 and R_{13} or between R_6 and R_{13},
- with V being O, S; with Y being O, S, $C(CN)_2$; with U being O, S, $C(CN)_2$,
- with R_7 and R_8 each independently of one another being selected from a group H, CN, F, aryl, heteroaryl, C_2–C_{20} alkenyl, alkynyl, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, where hydrogen atoms of the C_1–C_{20} alkyl may be substituted, where for each of the groups EWG1 and EWG2, each independently of one another in each case for each C=C double bond, both the E-isomer and the Z-isomer may be present.

3. The compounds of the formula I as claimed in claim 1 or 2 with c being 1, having the general formula

$$EWG1\ -(T1)_a-(T2)_b-Z\ -(T3)_d-(T4)_e-EWG2$$

4. The compounds of the formula I as claimed in any one of the preceding claims, wherein the electron-withdrawing groups EWG1 or EWG2 are the following group:



, and/or

where R_4 and R_{12} are CN.

5. The compounds as claimed in any one of the preceding claims, having the general formula

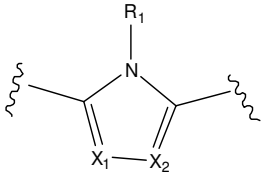
$$EWG1\ -(T1)_a-(T2)_b-(Z)_c-(T3)_d-(T4)_e-EWG2$$

with one of the indices a, b, d and e being 0.

6. The compounds of the formula I as claimed in any one of the preceding claims, with c = 1, of the general formula

$$EWG1\ -(T1)_a-(T2)_b-Z-(T3)_d-(T4)_e-EWG2$$

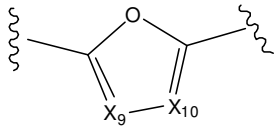
with Z = *-M-N-* or *-N-M-* and M being a group of the formula 1:



, and/or

where X_1 and X_2 independently of one another are selected from C-R with each R independently of any other selected from a group composed of H, halogen, branched or linear, cyclic or open-chain C_1-C_{20} alkyl, and/or

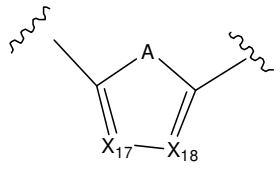
where the group N is the following general group of the formula 4:



.

7. The compounds as claimed in the preceding claim, where X_9 and X_{10} independently of one another are selected from C–R with each R independently of any other being selected from a group composed of H, halogen, branched or linear, cyclic or open-chain C_1–C_{20} alkyl.

8. The compounds of the formula I as claimed in any one of preceding claims 5 to 7, where b is 1 and T2 is the general group of the formula 10

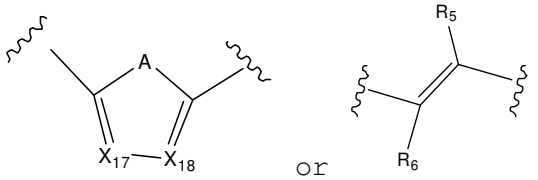


.

9. The compound of the general formula I as claimed in the preceding claim, wherein A in the formula 10 is S or O and/or

with X_{17} and X_{18} being C–R, where R independently at each occurrence is selected from a group composed of H, halogen, branched or linear, cyclic or open-chain C_1–C_{20} alkyl.

10. The compounds of the formula I as claimed in any one of preceding claims 5 to 9, where d = 1 and the group T3 is selected from the groups of the formulae 10 or 11:



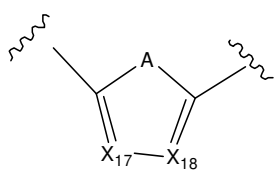
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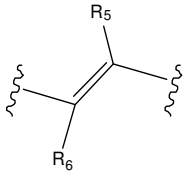
11. The compound as claimed in the preceding claim, where X_{17} and X_{18} are C–R, where R independently at each occurrence is selected from a group composed of H, halogen, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, R_5 and R_6 each independently of one another are selected from H, CN, F, aryl, heteroaryl, C_2–C_{20} alkenyl, alkynyl, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, where hydrogen atoms of the C_1–C_{20} alkyl may be substituted, where, if the substituent R_5 and R_6 is present in the compound, a ring closure is possible between R_5 with R_{13} or R_6 with R_{13}, with the proviso that the double bond from formula 11 or

formula 11* is located between R_5 and R_{13} or between R_6 and R_{13} and/or

where the ring closure between the substituents R_5 with R_{13} or R_6 with R_{13} is present in the form of an optionally substituted cyclopentenyl ring or of an optionally substituted cyclohexenyl ring.

12. The compounds of the formula I as claimed in any one of preceding claims 5 to 11, where d = 1 and the group T4 is a group of the formula 10 or 11:



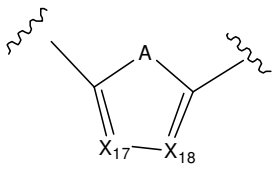
or


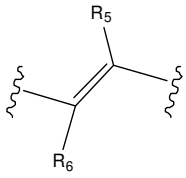
, and

where preferably A = O or S in the formula 10.

13. The compound as claimed in the preceding claim, where X_{17} and X_{18} are C–R, where R is selected independently of any other from a group composed of H, halogen, branched or linear, cyclic or open-chain C_1–C_{20} alkyl.

14. The compounds as claimed in any one of preceding claims 5 to 10, where a = 1 and the group T1 is selected from the groups of the formulae 10 and/or 11:



and/or


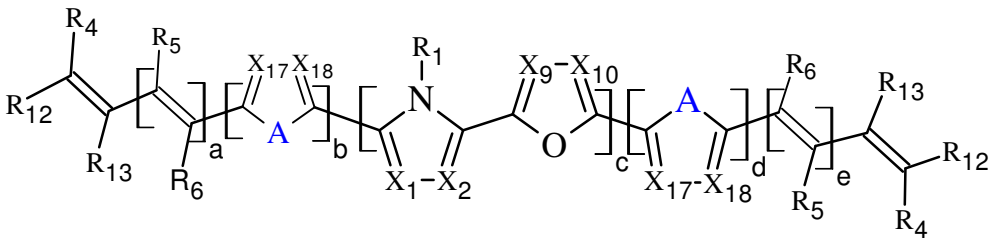
, and

where preferably A = S or O for the formula 10.

15. The compounds as claimed in the preceding claim, where X_{17} and X_{18} are C–R, where R independently at each occurrence is selected from a group composed of H, halogen, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, R5 and R6 are each selected independently of one another from H, CN, F, aryl, heteroaryl, C_2–C_{20} alkenyl, alkynyl, branched or linear, cyclic or open-chain C_1–

C_{20} alkyl, where hydrogen atoms of the C_1–C_{20} alkyl may be substituted, where, if the substituent R_5 and R_6 is present in the compound, a ring closure between R_5 with R_{13} and also between R_6 with R_{13} is possible, with the proviso that the double bond from formula 11 or formula 11* is located between R_5 and R_{13} or between R_6 and R_{13}.

16. The compounds as claimed in claim 1 or 2, having the following general structural formula II:



and

where preferably A is O or S independently of one another for A.

17. The compound as claimed in claim 16, where independently of one another X_{17}, X_{18}, X_1, X_2, X_9 and X_{10} are C–R, where R independently at each occurrence is selected from a group composed of H, halogen, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, R_5 and R_6 each independently of one another are selected from H, CN, F, aryl, heteroaryl, C_2–C_{20} alkenyl, alkynyl, branched or linear, cyclic or open-chain C_1–C_{20} alkyl, where hydrogen atoms of the C_1–C_{20} alkyl may be substituted, and where, if the substituents R_5 and R_6 are present, a ring closure may be formed between R_5 with R_{13} or R_6 with R_{13}, and/or

where c is 1 and/or

where b is 1 and/or

where e is 1 and/or

where R_4 and R_{12} each independently of one another are selected from H, CN, with the proviso that R_4 and R_{12} cannot both be H.

18. The use of one or more compounds as claimed in any one of claims 1 to 17 in an organic electronic component, preferably

in an organic photoactive element, preferably in a solar cell.

19. An organic electronic device comprising one or more compounds as claimed in any one of claims 1 to 17.

20. The organic electronic device as claimed in the preceding claim, comprising an electrode and a counterelectrode and at least one organic photoactive layer between the electrode and the counterelectrode, where the organic photoactive layer comprises at least one of the compounds as claimed in any one of claims 1 to 17.