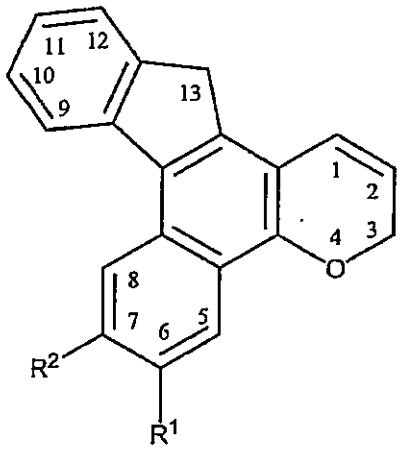
CLAIMS

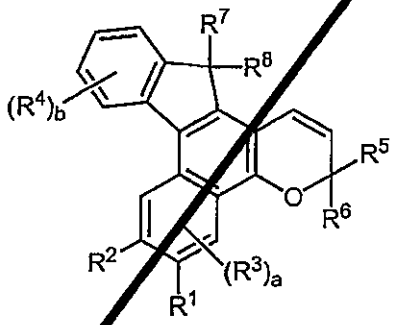
1. A chromene compound having a skeleton represented by the following formula (1):



(1)

wherein R^1 is an aryl group or a heteroaryl group, and R^2 is an electron donor group having a Hammett constant σ_p of not more than -0.1.

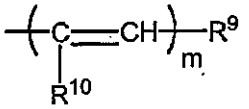
2. The chromene compound according to claim 1 which is represented by the following formula (2):



(2)

wherein R^1 and R^2 are as defined in the above formula (1), R^3 and R^4 are each independently a hydroxyl group, alkyl group, haloalkyl group, cycloalkyl group, alkoxy group, amino group, heterocyclic group having a ring member nitrogen atom and bonded to a benzene ring bonded thereto via the nitrogen atom, cyano group, nitro group, formyl group, hydroxycarbonyl group, alkylcarbonyl group, alkoxycarbonyl group, halogen atom, aralkyl group, aralkoxy group, aryl group or aryloxy

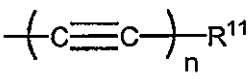
group, R^5 and R^6 are each independently a group represented by the following formula (3):



(3)

wherein R^9 is an aryl group or heteroaryl group, R^{10} is a hydrogen atom, alkyl group or halogen atom, and m is an integer of 1 to 3,

group represented by the following formula (4):



(4)

wherein R^{11} is an aryl group or heteroaryl group, and n is an integer of 1 to 3,

aryl group, heteroaryl group or alkyl group, R^5 and R^6 may be bonded together to form an aliphatic hydrocarbon ring together with the carbon atom bonded thereto, R^7 and R^8 are each independently a hydrogen atom, hydroxyl group, alkyl group, haloalkyl group, cycloalkyl group, alkoxy group, amino group, heterocyclic group having a ring member nitrogen atom and bonded to the 13-position carbon atom via the nitrogen atom, cyano group, nitro group, formyl group, hydroxycarbonyl group, alkylcarbonyl group, alkoxycarbonyl group, halogen atom, aralkyl group, aralkoxy group, aryl group or aryloxy group, R^7 and R^8 may be bonded together to form an aliphatic ring having 3 to 20 ring member carbon atoms, condensed polycyclic ring having an aromatic ring or an aromatic hetero ring condensed to the aliphatic ring, hetero ring having 3 to 20 ring member atoms, or condensed polycyclic ring having an aromatic ring or an aromatic hetero ring condensed to the hetero ring, together with the 13-position carbon atom bonded thereto, "a" is an integer of 0 to 2, and b is an integer of 0 to 4, with the proviso that when "a" is 2, two R^3's may be the same or different and when b is 2 to 4, a plurality of R^4's may be the same or different.

3. The chromene compound according to claim 2, wherein R^1 is an aryl group having 6 to 14 carbon atom, a heteroaryl group having 4 to 12 carbon atoms, or an aryl group having 6 to 14 carbon atoms or a heteroaryl group having 4 to 12 carbon atoms substituted by at least one substituent selected from the group consisting of hydroxyl group, alkyl group, haloalkyl group, cycloalkyl group, alkoxy group, amino group, heterocyclic group having a ring member nitrogen atom and bonded to a benzene ring bonded thereto via the nitrogen atom, cyano group, nitro group, formyl group, hydroxycarbonyl group, alkylcarbonyl group, alkoxycarbonyl group, halogen atom, aralkyl group, aryl group and aryloxy group.

4. The chromene compound according to claim 2, wherein R^2 is a hydroxyl group, alkyl group, cycloalkyl group, alkoxy group, aryloxy group, amino group or heterocyclic group having a ring member nitrogen atom and bonded to the 7-position carbon atom via the nitrogen atom.

5. The chromene compound according to claim 2, wherein R^7 and R^8 are bonded together to form an aliphatic hydrocarbon ring together with the 13-position carbon atom, and the aliphatic hydrocarbon ring has 3 to 20 ring member carbon atoms and may have at least one substituent selected from the group consisting of alky group, haloalkyl group, cycloalkyl group, alkoxy group, amino group, aralkyl group, aryl group and halogen atom.

6. The chromene compound according to claim 5, wherein the aliphatic hydrocarbon ring is a cyclohexane ring substituted by an alkyl group having 1 to 4 carbon atoms.

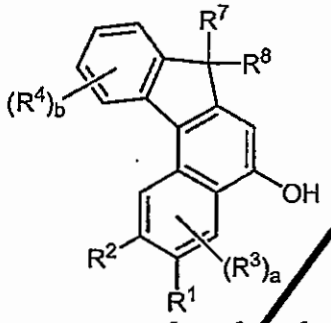
7. A photochromic curable composition comprising the

chromene compound of any one of claims 1 to 6 and a polymerizable monomer.

8. A photochromic optical article having a polymer molded product containing the chromene compound of any one of claims 1 to 6 dispersed in the polymer molded product as a constituent member.

9. An optical article having an optical substrate all or part of at least one surface of which is coated with a polymer film containing the chromene compound of any one of claims 1 to 6 dispersed in the polymer film as a constituent member.

10. A naphthol compound represented by the following formula (5):

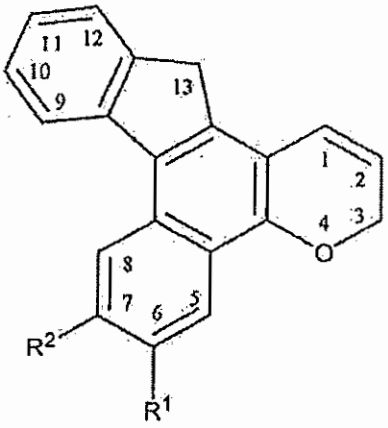


(5)

wherein R^1, R^2, R^3, a, R^4, b, R^7 and R^8 are as defined in the above formula (2).

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

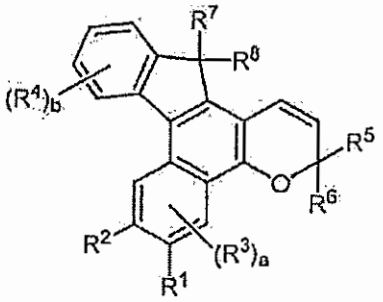
1. A chromene compound having a skeleton represented by the following formula (1):



(1)

wherein R^1 is an aryl group or a heteroaryl group, and R^2 is an electron donor group having a Hammett constant σ_p of not more than -0.1.

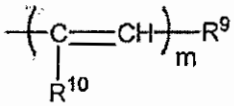
2. The chromene compound according to claim 1 which is represented by the following formula (2):



(2)

wherein R^1 and R^2 are as defined in the above formula (1), R^3 and R^4 are each independently a hydroxyl group, alkyl group, haloalkyl group, cycloalkyl group, alkoxy group, amino group, heterocyclic group having a ring member nitrogen atom and bonded to a benzene ring bonded thereto via the nitrogen atom, cyano group, nitro group, formyl group, hydroxycarbonyl group, alkylcarbonyl group, alkoxycarbonyl group, halogen atom, aralkyl group, aralkoxy group, aryl group or aryloxy group, R^5

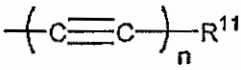
and R^6 are each independently a group represented by the following formula (3):



(3)

wherein R^9 is an aryl group or heteroaryl group, R^{10} is a hydrogen atom, alkyl group or halogen atom, and m is an integer of 1 to 3,

group represented by the following formula (4):



(4)

wherein R^{11} is an aryl group or heteroaryl group, and n is an integer of 1 to 3,

aryl group, heteroaryl group or alkyl group, R^5 and R^6 may be bonded together to form an aliphatic hydrocarbon ring together with the carbon atom bonded thereto, R^7 and R^8 are each independently a hydrogen atom, hydroxyl group, alkyl group, haloalkyl group, cycloalkyl group, alkoxy group, amino group, heterocyclic group having a ring member nitrogen atom and bonded to the 13-position carbon atom via the nitrogen atom, cyano group, nitro group, formyl group, hydroxycarbonyl group, alkylcarbonyl group, alkoxycarbonyl group, halogen atom, aralkyl group, aralkoxy group, aryl group or aryloxy group, R^7 and R^8 may be bonded together to form an aliphatic ring having 3 to 20 ring member carbon atoms, condensed polycyclic ring having an aromatic ring or an aromatic hetero ring condensed to the aliphatic ring, hetero ring having 3 to 20 ring member atoms, or condensed polycyclic ring having an aromatic ring or an aromatic hetero ring condensed to the hetero ring, together with the 13-position carbon atom bonded thereto, "a" is an integer of 0 to 2, and b is an integer of 0 to 4, with the proviso that when "a" is 2, two R^3's may be the same or different and when b is 2 to 4, a plurality of R^4's may be the same or different.

3. The chromene compound according to claim 2, wherein R^1 is an aryl group having 6 to 14 carbon atoms, a heteroaryl group having 4 to 12 carbon atoms, or an aryl group having 6 to 14 carbon atoms or a heteroaryl group having 4 to 12 carbon atoms substituted by at least one substituent selected from the group consisting of hydroxyl group, alkyl group, haloalkyl group, cycloalkyl group, alkoxy group, amino group, heterocyclic group having a ring member nitrogen atom and bonded to a benzene ring bonded thereto via the nitrogen atom, cyano group, nitro group, formyl group, hydroxycarbonyl group, alkylcarbonyl group, alkoxycarbonyl group, halogen atom, aralkyl group, aryl group and aryloxy group.

4. The chromene compound according to claim 2 or claim 3, wherein R^2 is a hydroxyl group, alkyl group, cycloalkyl group, alkoxy group, aryloxy group, amino group or heterocyclic group having a ring member nitrogen atom and bonded to the 7-position carbon atom via the nitrogen atom.

5. The chromene compound according to any one of claims 2 to 4, wherein R^7 and R^8 are bonded together to form an aliphatic hydrocarbon ring together with the 13-position carbon atom, and the aliphatic hydrocarbon ring has 3 to 20 ring member carbon atoms and may have at least one substituent selected from the group consisting of alkyl group, haloalkyl group, cycloalkyl group, alkoxy group, amino group, aralkyl group, aryl group and halogen atom.

6. The chromene compound according to claim 5, wherein the aliphatic hydrocarbon ring is a cyclohexane ring substituted by an alkyl group having 1 to 4 carbon atoms.

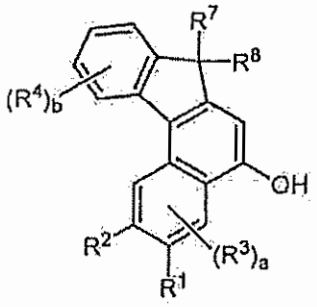
7. A photochromic curable composition comprising the chromene

compound of any one of claims 1 to 6 and a polymerizable monomer.

8. A photochromic optical article having a polymer molded product containing the chromene compound of any one of claims 1 to 6 dispersed in the polymer molded product as a constituent member.

9. An optical article having an optical substrate all or part of at least one surface of which is coated with a polymer film containing the chromene compound of any one of claims 1 to 6 dispersed in the polymer film as a constituent member.

10. A naphthol compound represented by the following formula (5):



(5)

wherein R^1, R^2, R^3, a, R^4, b, R^7 and R^8 are as defined in the above formula (2).

11. A chromene compound according to claim 1, substantially as hereinbefore described, with reference to any one of the Examples; excluding Comparative Examples.

12. A naphthol compound according to claim 10, substantially as hereinbefore described, with reference to any one of the Examples; excluding Comparative Examples.