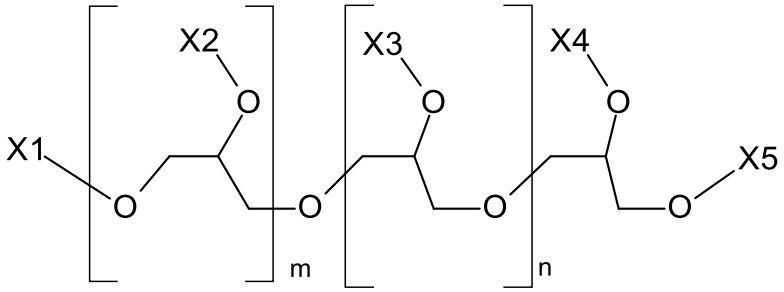
Use of an ultraviolet radiation absorbing composition as a light stabilizer for a shaped artificial polymer article.

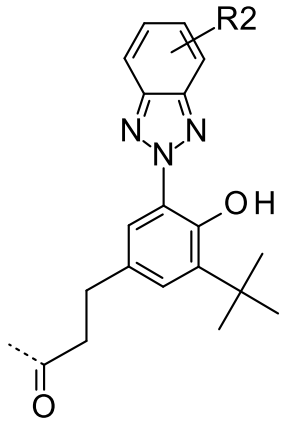
The present disclosure relates to the use of an ultraviolet radiation absorbing composition as a light stabilizer for a shaped artificial polymer article, the stabilized shaped artificial polymer article and an extruded, molded or calendered polymer composition containing the ultraviolet radiation absorbing composition.

In an aspect, there is provided the use of an ultraviolet radiation absorbing composition as a light stabilizer for a shaped artificial polymer article, wherein the polymer is a synthetic polymer and/or a natural elastomer and wherein the ultraviolet radiation absorbing composition comprises the compound of the general formula (I)



(I)

wherein n and m, independently from each other, are a number from 0 to 20, and at least one of m and n is ≥ 1; and X1, X2, X3, X4 and X5 are the same or different and are independently selected from H, C(O)R1 with R1 being C_8-C_{24}-alkyl, or a group of the general formula (II)

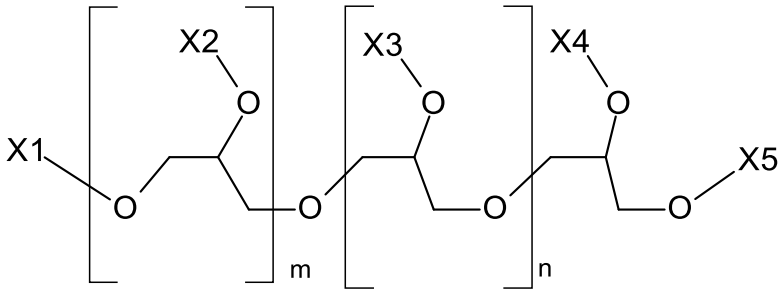


(II)

with R2 being H or halogen,

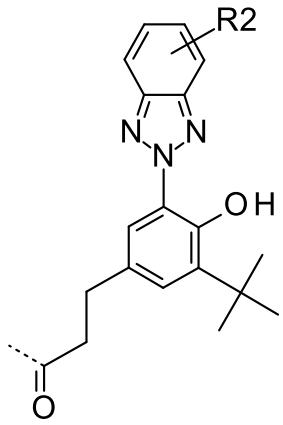
wherein the compound of the general formula (I) comprises an amount of covalently bound chromophores of > 70 wt. -% based on the total weight of the compound of formula (I).

In another aspect, there is provided a shaped artificial polymer article wherein the polymer is a synthetic polymer and/or a natural elastomer and wherein the polymer contains an ultraviolet radiation absorbing composition which comprises the compound of the general formula (I)



(I)

wherein n and m, independently from each other, are a number from 0 to 20, and at least one of m and n is ≥ 1; and X1, X2, X3, X4 and X5 are the same or different and are independently selected from H, C(O)R1 with R1 being C_8-C_{24}-alkyl, or a group of the general formula (II)



(II)

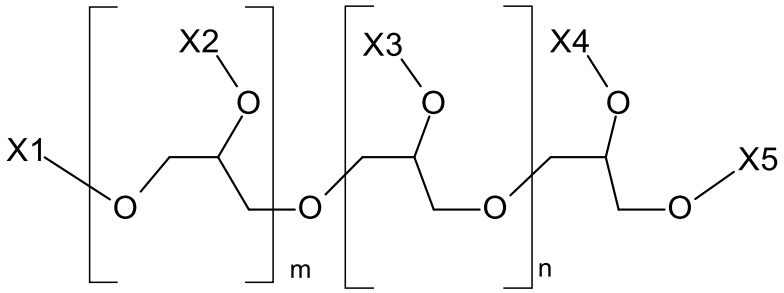
with R2 being H or halogen,

wherein the compound of the general formula (I) comprises an amount of covalently bound chromophores of > 70 wt. -% based on the total weight of the compound of formula (I).

In another aspect, there is provided an extruded, molded or calendered polymer composition comprising

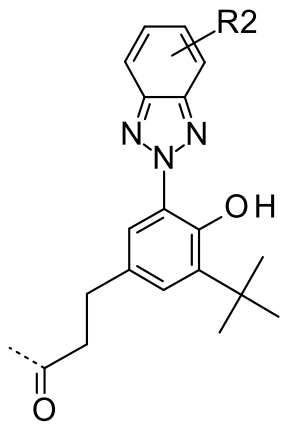
(1) a synthetic polymer and/or a natural elastomer, and

(2) an ultraviolet radiation absorbing composition which comprises the compound of the general formula (I)



(I)

wherein n and m, independently from each other, are a number from 0 to 20, and at least one of m and n is ≥ 1; and X1, X2, X3, X4 and X5 are the same or different and are independently selected from H, C(O)R1 with R1 being C_8-C_{24}-alkyl, or a group of the general formula (II)

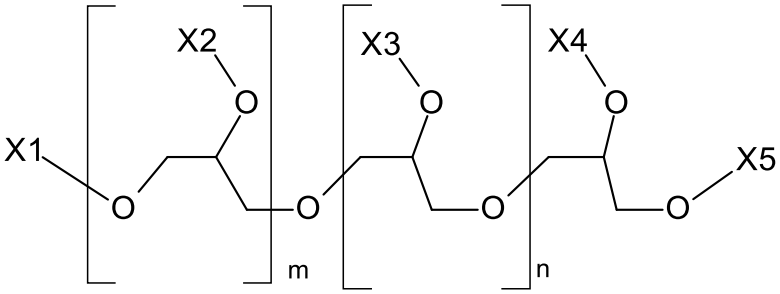


(II)

with R2 being H or halogen,

wherein the compound of the general formula (I) comprises an amount of covalently bound chromophores of > 70 wt. -% based on the total weight of the compound of formula (I).

The present invention relates in particular to the use of an ultraviolet radiation absorbing composition (an additive composition) as a light stabilizer for a shaped artificial (or industrial) polymer article, wherein the polymer is a synthetic polymer and/or a natural elastomer and wherein the ultraviolet radiation absorbing composition comprises the compound of the general formula (I)

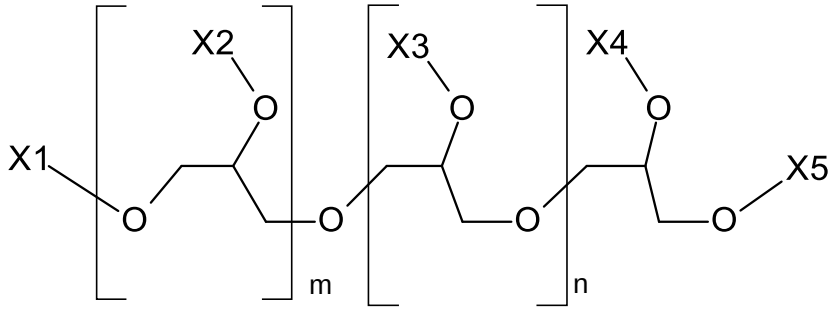


(I)

wherein n and m, independently from each other, are a number from 0 to 20, and at least one of m and n is ≥ 1; and X1, X2, X3, X4 and X5 are the same or different and are independently selected from H, C(O)R1 with R1 being C_8-C_{24}-alkyl, or a group of the general formula (II)

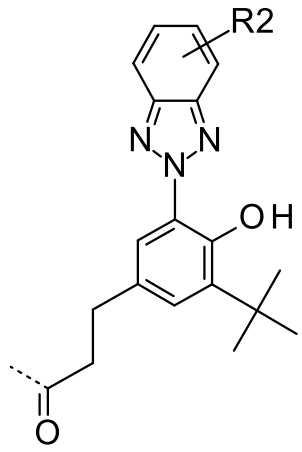
Claims

1. Use of an ultraviolet radiation absorbing composition as a light stabilizer for a shaped artificial polymer article, wherein the polymer is a synthetic polymer and/or a natural elastomer and wherein the ultraviolet radiation absorbing composition comprises the compound of the general formula (I)



(I)

wherein n and m, independently from each other, are a number from 0 to 20, and at least one of m and n is ≥ 1; and X1, X2, X3, X4 and X5 are the same or different and are independently selected from H, C(O)R1 with R1 being C_8-C_{24}-alkyl, or a group of the general formula (II)



(II)

with R2 being H or halogen,
wherein the compound of the general formula (I) comprises an amount of covalently bound chromophores of > 70 wt. -% based on the total weight of the compound of formula (I).

2. The use according to claim 1, wherein the compound of the general formula (I) has an average molecular weight (Mw) of > 300 Da.

3. The use according to claim 1 or 2, wherein the compound of the general formula (I) has E 1% 1 cm (343 - 344 nm) of > 200 nm.

4. The use according to any one of claims 1 to 3, wherein the ultraviolet radiation absorbing composition additionally comprises one or more components selected from the group compris-

ing 3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxy-benzenepropanoic acid methyl ester, 3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxy-benzenepropanoic acid, methanol and tin.

5. The use according to claim 4, wherein the concentration of 3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxy-benzenepropanoic acid methyl ester and/or 3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxy-benzenepropanoic acid, in the ultraviolet radiation absorbing composition is ≤ 5.0 wt.-%, based on the total weight of the ultraviolet radiation absorbing composition.

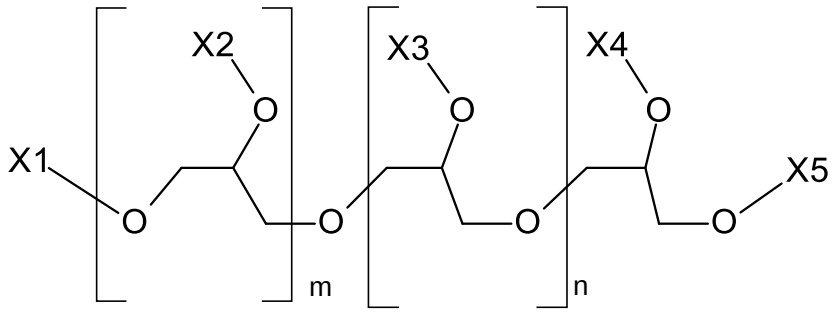
6. The use according to claim 4, wherein the sum of the concentrations of 3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxy-benzenepropanoic acid and 3-(2H-benzotriazol-2-yl)-5-(1,1-dimethylethyl)-4-hydroxy-benzenepropanoic acid methyl ester in the ultraviolet radiation absorbing composition is ≤ 5.0 wt.-%, based on the total weight of the ultraviolet radiation absorbing composition.

7. The use according to claims 4, wherein the concentration of tin in the ultraviolet radiation absorbing composition is < 700 ppm.

8. The use according to any one of claims 1 to 3, wherein the ultraviolet radiation absorbing composition is essentially free of tin.

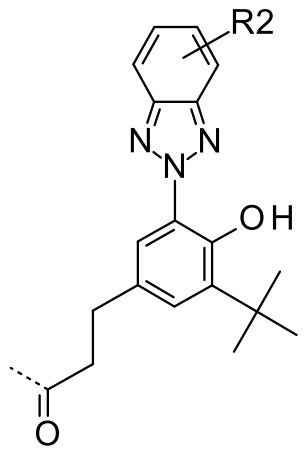
9. The use according to claim 4, wherein the concentration of methanol in the ultraviolet radiation absorbing composition is < 3,000 ppm.

10. A shaped artificial polymer article wherein the polymer is a synthetic polymer and/or a natural elastomer and wherein the polymer contains an ultraviolet radiation absorbing composition which comprises the compound of the general formula (I)



(I)

wherein n and m, independently from each other, are a number from 0 to 20, and at least one of m and n is ≥ 1; and X1, X2, X3, X4 and X5 are the same or different and are independently selected from H, C(O)R1 with R1 being C_8-C_{24}-alkyl, or a group of the general formula (II)



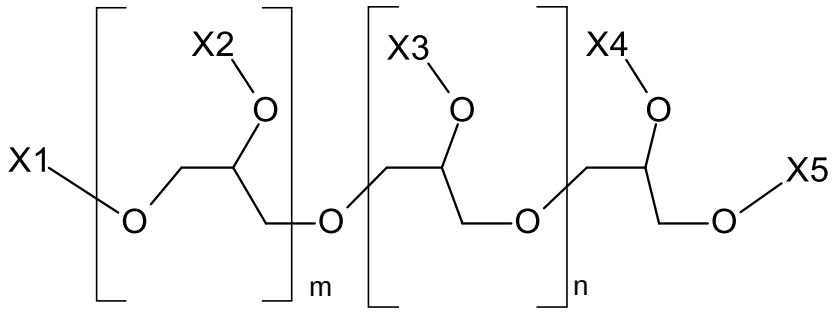
(II)

with R2 being H or halogen,
wherein the compound of the general formula (I) comprises an amount of covalently bound chromophores of > 70 wt. -%, based on the total weight of the compound of formula (I).

11. A shaped artificial polymer article according to claim 10, which is an extruded, molded or calendered shaped artificial polymer article.

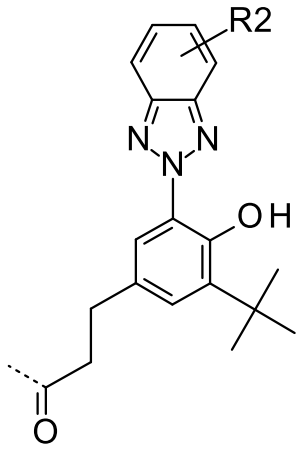
12. A shaped artificial polymer article according to claim 10, which is a film, pipe, cable, tape, sheet, container, frame, fibre or monofilament.

13. An extruded, molded or calendered polymer composition comprising
(1) a synthetic polymer and/or a natural elastomer, and
(2) an ultraviolet radiation absorbing composition which comprises the compound of the general formula (I)



(I)

wherein n and m, independently from each other, are a number from 0 to 20, and at least one of m and n is ≥ 1; and X1, X2, X3, X4 and X5 are the same or different and are independently selected from H, C(O)R1 with R1 being C_8-C_{24}-alkyl, or a group of the general formula (II)



(II)

with R2 being H or halogen,

wherein the compound of the general formula (I) comprises an amount of covalently bound chromophores of > 70 wt. -%, based on the total weight of the compound of formula (I).

14. An extruded, molded or calendered polymer composition according to claim 13, wherein the compound of general formula (I) is present in an amount of from 0.001 to 10 % by weight, based on the weight of the extruded, molded or calendered polymer composition.