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(54) Titre : PIECES MOULEES DETECTABLES AUX RAYONS X ET AYANT UNE STABILITE LONGUE DUREE
AMELIOREE

(54) Title: X-RAY CONTRASTING MOULDED PART WITH IMPROVED LONG-TERM STABILITY

(57) **Abrégé/Abstract:**

The invention relates to the use of a mixture of at least one brominated and/or iodinated oligocarbonate, polycarbonate and/or copolycarbonate and at least one stabilizer for the production of X-ray contrasting plastic moulded parts with improved long-term stability.



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X-ray contrastable mouldings with improved long-term stability

Abstract

The present invention relates to the use of a mixture of at least one brominated and/or iodised oligo-, poly- and/or copolycarbonate and at least one stabiliser for producing X-ray contrastable mouldings made of plastics material with improved long-term stability.

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X-ray contrastable mouldings with improved long-term stability

The present invention relates to the use of a mixture of at least one brominated and/or iodised oligo-, poly- and/or copolycarbonate and at least one stabiliser to prepare X-ray
5 contrastable mouldings made of plastics material.

Specific mouldings in the context of the present invention are in particular those for medical applications such as probes or joint parts and toys for children, such as building
10 blocks.

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In the medical sphere and for children's toys, materials which are as transparent as possible and have good mechanical properties are desired, which can be detected in the body by X-ray examination. Commercially available moulding compounds based on polycarbonates are not suitable for this purpose as their contrast in the X-ray image is
15 too low. A material which is used for this purpose is, for example, PVC, but it is not transparent. Known iodine-containing polymers also have only inadequate mechanical properties and/or can only be produced with difficulty.

The object was accordingly to develop moulding compounds which have good me-
20 chanical properties, a high degree of transparency and a glass transition temperature well above 100 °C and which exhibit good contrast during X-ray examinations.

The great advantage of the mouldings according to the invention is that they have improved X-ray contrast and can therefore easily be detected, in other words can be
25 used efficiently on the one hand in specific operations and on the other hand to remedy accidents caused by children swallowing or inhaling toys.

US-A 3 469 704 describes polycarbonates which have iodine phenyls as terminal group (column 2, line 60 ff.).

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Iodine-containing diphenylcarbonates and their addition to polycarbonates are known from US-A 3 382 207.

According to DE-A 17 20 812, iodine-containing phenols are known as chain terminators for polycarbonates. See also the corresponding GB-PA 11 63 816.

According to US-A 3 535 300, iodine-containing compounds are also known as additives to polycarbonate (column 4, line 64; column 5, line 43).

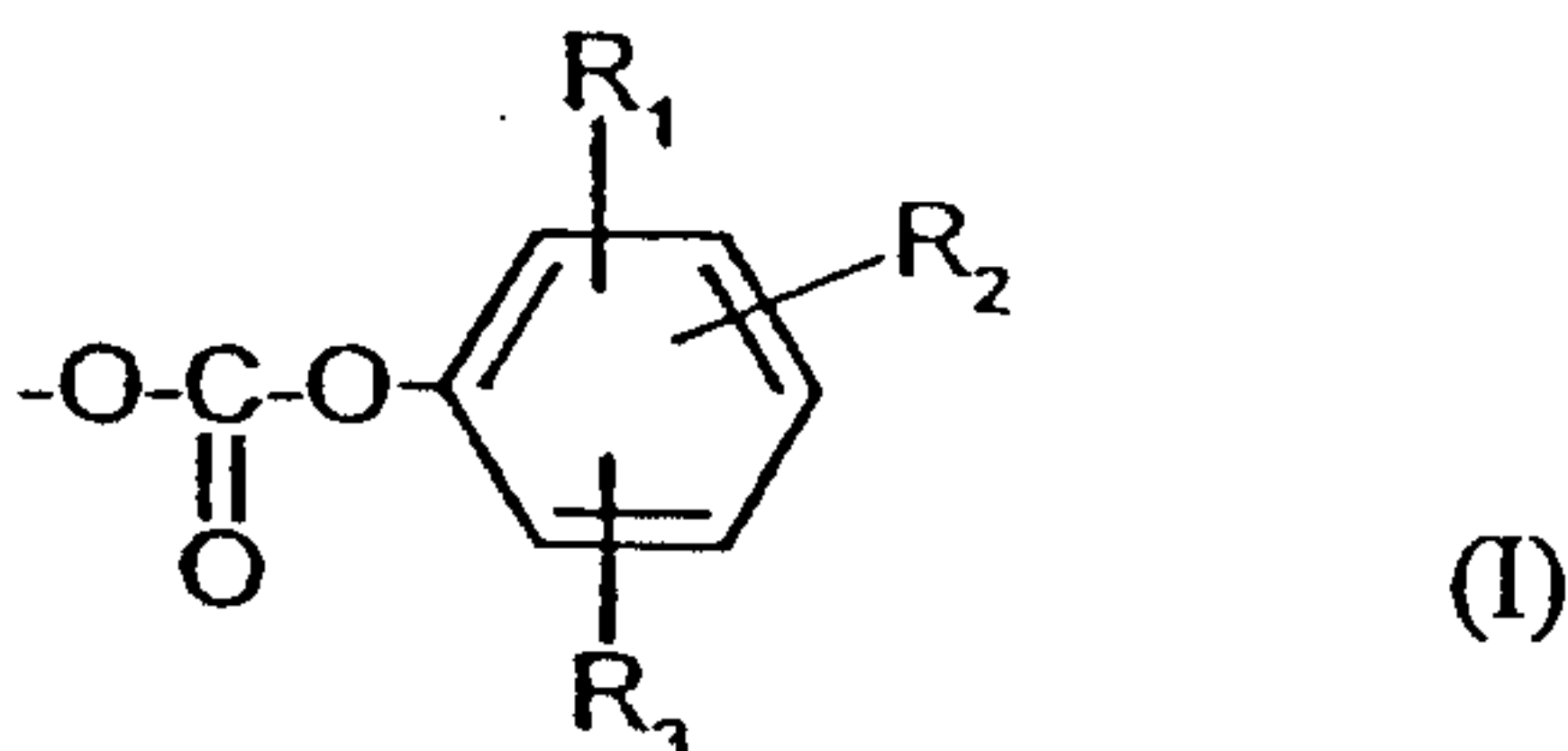
Use as X-ray contrast medium is not described for these materials, nor is the use to prepare X-ray contrastable mouldings. It has accordingly been found that whilst mouldings with at least one brominated and/or iodised oligo-, poly- and/or copolycarbonate are highly X-ray contrastable, they discolour with time in daylight even in closed spaces.

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Surprisingly this can be remedied by the addition of stabilisers from the benzotriazole series or benzophenone series.

The present invention accordingly relates to the use of a mixture of at least one brominated and/or iodised oligo-, poly- and/or copolycarbonate and at least one stabiliser to prepare X-ray contrastable mouldings made from plastics material.

Oligo-, poly- or copolycarbonates according to the invention have, for example, a \bar{M}_w between 600 and 100,000, preferably between 1,000 and 80,000, particularly preferably between 3,000 and 40,000 and have terminal iodine or bromophenylcarbonate groups, preferably terminal groups of general formula (I)



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wherein

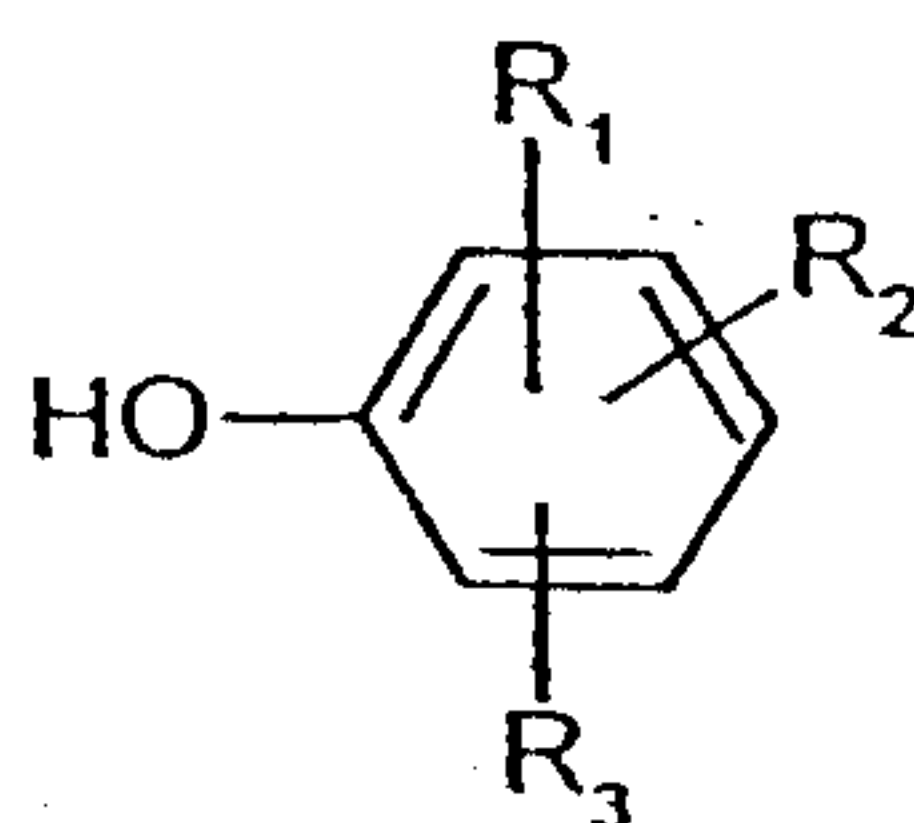
R_1 to R_3 represents H, C_1 - C_{18} optionally branched alkyl, Cl, Br or I provided that at least one of the radicals R_1 , R_2 and R_3 represents I and/or Br.

5

Preferred terminal groups are terminal 4-iodophenylcarbonate and 2,4,6-triiodophenylcarbonate groups.

Examples of iodophenols (Ia) which lead to terminal groups according to the invention when used as chain terminators in conventional processes for producing polycarbonate, preferably the phase interface process,

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(Ia)

include 2-/3- or 4-iodophenol, 2-/3- or 4-iodo-6-methylphenol, 4- or 6-iodo-3-methylphenol, 2- or 6-iodo-4-methylphenol, 4,5-diiido-2-methylphenol, 4,6-diiido-2-methylphenyl, 4,5-diiido-3-methylphenol, 4,6-diiido-3-methylphenol, 2,4,6-triiodophenol, preferably 4-iodophenol and 2,4,6-triiodophenol.

Iodophenols are compounds available in the chemicals industry or in organic syntheses of aromatic intermediate products, possibly via diazonium salts. They can be used individually, in combinations, possibly also in combinations with conventional chain terminators such as phenol, p-tert.-butylphenol, hexylphenol, i-octylphenol or nonylphenol.

Diphenols such as hydroquinone, resorcinol, dihydroxydiphenyls, bis(hydroxyphenyl)alkanes, bis(hydroxyphenyl)-cycloalkanes, bis(hydroxyphenyl)-sulphides,

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bis(hydroxyphenyl)-sulphoxides, á,á'-bis(hydroxyphenyl)-diisopropylbenzenes, and their compounds alkylated in the nucleus can be used as diol component for the oligo-, poly- or copolycarbonates according to the invention with terminal groups of general formula (I).

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Preferred diphenols are 4,4'-dihydroxydiphenyl, 2,2-bis(4-hydroxyphenyl)-propane, 2,4-bis(4-hydroxyphenyl)-2-methylbutane, 1,1-bis(4-hydroxyphenyl)-p-diisopropylbenzene, 2,2-bis(3-methyl-4-hydroxyphenyl)-propane, 2,2-bis(3-chloro-4-hydroxyphenyl)-propane, bis(3,5-dimethyl-4-hydroxyphenyl)-methane, 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)-propane, bis(3,5-dimethyl-4-hydroxyphenyl)-sulphone, 2,4-bis(3,5-dimethyl-4-hydroxyphenyl)-2-methylbutane, 1,1-bis(3,5-dimethyl-4-hydroxyphenyl)-p-diisopropylbenzene, 2,2-bis(3,5-dichloro-4-hydroxyphenyl)-propane, 2,2-bis(3,5-dibromo-4-hydroxyphenyl)-propane and 1,1-bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane.

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Particularly preferred diphenols are 2,2-bis(4-hydroxyphenyl)-propane, 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)-propane, 2,2-bis(3,5-dichloro-4-hydroxyphenyl)-propane, 2,2-bis(3,5-dibromo-4-hydroxyphenyl)-propane, 1,1-bis(4-hydroxyphenyl)-cyclohexane and 1,1-bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane.

20

The oligo-, poly- or copolycarbonates according to the invention with terminal groups of general formula (I) can be straight or branched in known manner. Suitable branching agents are triphenols, trimesic acid (trichloride), cyanuric acid trichloride and 3,3-bis(3-methyl-4-hydroxyphenyl)-2-oxo-2,3-dihydroindole.

25

Oligo-, poly- or copolycarbonates with iodised and/or brominated diols, such as iodised or brominated derivatives of hydroquinone, resorcinol, dihydroxydiphenyls, bis(hydroxyphenyl)-alkanes, bis(hydroxyphenyl)-cycloalkanes, bis(hydroxyphenyl)-sulphides, bis(hydroxyphenyl)-ethers, bis(hydroxyphenyl)-ketones, bis(hydroxyphenyl)-sulphones, bis(hydroxyphenyl)-sulphoxides, á,á'-bis(hydroxyphenyl)-diisopropylbenzenes, and compounds thereof alkylated in the nucleus, the iodine and/or bromine

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atoms preferably being located on the aromatic nucleus of the diols, can also be used as oligo-, poly- or copolycarbonates according to the invention.

Preferred iodised and/or brominated diphenols are the singly or repeatedly iodised and/or brominated derivatives of 4,4'-dihydroxydiphenyl, 2,2-bis(4-hydroxyphenyl)-propane, 2,4-bis(4-hydroxyphenyl)-2-methylbutane, 1,1-bis(4-hydroxyphenyl)-p-diisopropylbenzene, 2,2-bis(3-methyl-4-hydroxyphenyl)-propane, 2,2-bis(3-chloro-4-hydroxyphenyl)-propane, bis(3,5-dimethyl-4-hydroxyphenyl)-methane, 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)-propane, bis(3,5-dimethyl-4-hydroxyphenyl)-sulphone, 2,4-bis(3,5-dimethyl-4-hydroxyphenyl)-2-methylbutane, 1,1-bis(3,5-dimethyl-4-hydroxyphenyl)-p-diisopropylbenzene 2,2-bis(3,5-dichloro-4-hydroxyphenyl)-propane, 2,2-bis(3,5-dibromo-4-hydroxyphenyl)-propane and 1,1-bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane.

Particularly preferred iodised and/or brominated diphenols are the singly or repeatedly iodised and/or brominated derivatives of 2,2-bis(4-hydroxyphenyl)-propane, 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)-propane, 2,2-bis(3,5-dichloro-4-hydroxyphenyl)-propane, 2,2-bis(3,5-dibromo-4-hydroxyphenyl)-propane, 1,1-bis(4-hydroxyphenyl)-cyclohexane and 1,1-bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane.

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2,2-bis(3,5-dibromo-4-hydroxyphenyl)-propane (tetrabromobisphenol) and/or and 2,2-bis(4-hydroxy-3,5-diiodophenyl)-propane (tetraiodobisphenol), optionally mixed with one another or optionally with other diols, are preferred for the oligo-, poly- and/or copolycarbonates according to the invention.

25

The oligo-, poly- and/or copolycarbonates according to the invention are used in quantities of 0.1 to 100 wt.%, preferably 0.1 to 20 wt.%, particularly preferably 1 to 10 wt.% and more particularly preferably 2 to 7 wt.% relative to the moulding.

The mixture also contains a stabiliser from the benzotriazole series in quantities between 0.01 and 10 wt.%, preferably in quantities between 0.1 and 1 wt.%.

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Preferred stabilisers are UV absorbers, as described, for example, in EP 0 839 623 A1 or EP 0 500 496 A1. Benzotriazoles such as 2-(3',5'-bis(1,1-dimethylbenzyl)-2'-hydroxy-phenyl)-benzotriazole, 2-(2'-hydroxy-5'-(*tert*-octyl)-phenyl)-benzotriazole, 2-
5 (2'-hydroxy-3'-(2-butyl)-5'-(*tert*-butyl)-phenyl)-benzotriazole, bis(3-(2H-benzotriazolyl)-2-hydroxy-5-*tert*-octyl)methane are particularly suitable.

2-(4-hexoxy-2-hydroxyphenyl)-4,6-diphenyl-1,3,5-triazine and benzophenones such as 2,4-dihydroxy-benzophenone are however also preferably used.

10

The mouldings preferably additionally contain at least one transparent thermoplastic material, preferably an unhalogenated polycarbonate or copolycarbonate in quantities from 85 to 99.9 wt.%, preferably 90 to 99 wt.%, particularly preferably 93 to 98 wt.% relative to the moulding.

15

Polymers of ethylenically unsaturated monomers and/or polycondensates of bifunctional reactive compounds are particularly preferably used as transparent thermoplastic materials.

20 Particularly suitable transparent thermoplastic materials include polycarbonates or copolycarbonates based on diphenols. The oligomers according to the invention can, however, also be used with poly- or copolyacrylates and poly- or copolymethacrylates such as poly- or copolymethylmethacrylate, but also as copolymers with styrene such as transparent polystyrene acrylonitrile (SAN).

25

Furthermore, they can be mixed into transparent cycloolefins, poly- or copolycondensates of terephthalic acid such as poly- or copolyethylene terephthalate (PET or CoPET) or glycol-modified PET (PETG) for example.

30 The person skilled in the art obtains excellent results with polycarbonates and/or copolycarbonates, preferably unhalogenated polycarbonates and/or copolycarbonates.

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Thermoplastic aromatic polycarbonates in the context of the present invention include both homopolycarbonates and copolycarbonates. The polycarbonates can be straight or branched in known manner.

- 5 These polycarbonates are produced in known manner from diphenols, carbonic acid derivatives, optionally chain terminators and optionally branching agents.

Details regarding production of polycarbonates have been set down in many patent specifications over about 40 years. Reference is made by way of example here to
10 Schnell, "Chemistry and Physics of Polycarbonates", Polymer Reviews, Volume 9, Interscience Publishers, New York, London, Sydney 1964, to D. Freitag, U. Grigo, P.R. Müller, H. Nouvertne', BAYER AG, "Polycarbonates" in Encyclopedia of Polymer Science and Engineering, Volume 11, Second Edition, 1988, pages 648-718 and finally
15 to Dres. U. Grigo, K. Kirchner and P.R. Müller "Polycarbonate" in Becker/Braun, Kunststoff-Handbuch, Volume 3/1, Polycarbonate, Polyacetale, Polyester, Celluloseester, Carl Hanser Verlag Munich, Vienna 1992, pages 117-299.

Suitable diphenols for the production of the polycarbonates include, for example, hydroquinone, resorcinol, dihydroxydiphenyls, bis(hydroxyphenyl)-alkanes,
20 bis(hydroxyphenyl)-cycloalkanes, bis(hydroxyphenyl)-sulphides, bis(hydroxyphenyl)-ethers, bis(hydroxyphenyl)-ketones, bis(hydroxyphenyl)-sulphones, bis(hydroxyphenyl)-sulphoxides, α,α' -bis(hydroxyphenyl)-diisopropylbenzenes, and compounds thereof alkylated in the nucleus.

- 25 The polymer compositions obtained which are opaque to X-rays can be converted into shaped articles such as parts of toys, but also fibres, films, strips, sheets, multi-wall sheets, vessels, pipes and other profiles by conventional methods such as hot pressing, spinning, extrusion or injection moulding. The polymer compositions can also be processed into cast films.

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The use of multi-layer systems is also of interest. In this case, the composition according to the invention with a relatively high content of iodine-containing additives is applied in a thin layer to a shaped article made from a polymer which is transparent to X-rays. It can be applied at the same time as or directly after shaping of the basic element, for example by coextrusion or multi-component injection moulding. It can, however, also be applied to the finally shaped basic element, for example by lamination with a film or by coating with a solution. The moulding compounds are particularly suitable for transparent parts of children's toys or for medical applications. Such mouldings are particularly suitable for small parts of children's toys.

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Examples:

In the following examples η_{rel} is measured in dichloromethane at 25 °C and a concentration of 0.5 wt.%.

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Production of the iodised polycarbonates according to the invention**Example 1**

180 ml dichloromethane and 25.3 ml 6.5 % caustic soda solution were placed in a 1,000
10 ml three-necked flask equipped with stirrer, thermometer and reflux condenser. 22.83 g
2,2-bis(4-hydroxy-phenyl)-propane were dissolved therein with stirring and 15.8 g
phosgene were subsequently introduced within 5 min. 1.32 g 4-iodophenol were then
added, stirred for 5 min at room temperature and 0.137 ml N-ethylpiperidine added. The
mixture was stirred for 1 hour at room temperature and the organic phase was then
15 separated and washed with dilute acid. The mixture was subsequently washed with
demineralised water until the washing phases were practically free of electrolytes. The
organic phase was concentrated and dried for 16 hours at 80 °C in the vacuum drying
chamber in a water jet vacuum.

Yield: 26.3 g

20 $\eta_{rel} = 1.199$ **Example 2**

As example 1, except 2.83 g 2,4,6-triiodophenol were used as chain terminator instead
25 of 4-iodophenol.

Yield: 28.7 g

 $\eta_{rel} = 1.174$

For low molecular weight derivatives, the person skilled in the art can proceed as
30 follows:

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Production of iodised oligocarbonates according to the invention**Example 3**

5 450 ml dichloromethane, 19.8 g pyridine and 44.0 g iodophenol were placed in a 1,000 ml three-necked flask equipped with stirrer, thermometer and reflux condenser. 35.3 g bischlorocarbonic ester of 2,2-bis(4-hydroxy-phenyl)-propane dissolved in 200 ml dichloromethane were added dropwise within 40 min with stirring. The mixture was stirred for 1 hour at room temperature and then the organic phase was washed with
10 dilute acid. The mixture was subsequently washed with demineralised water until the washing phases were practically free of electrolytes. The organic phase was concentrated and dried for 16 hours at 50 °C in the vacuum drying chamber in a water jet vacuum.

Yield: 64.0 g

15

Example 4

900 ml dichloromethane, 19.8 g pyridine and 94.4 g 2,4,6-triiodophenol were placed in a 2,000 ml three-necked flask with stirrer, thermometer and reflux condenser. 35.3 g
20 bischlorocarbonic ester of 2,2-bis(4-hydroxy-phenyl)-propane dissolved in 200 ml dichloromethane were added dropwise within 65 min with stirring. The mixture was stirred for 15 min at room temperature and then the organic phase was washed with dilute acid. The mixture was then washed with demineralised water until the washing phases were practically free of electrolytes. The organic phase was concentrated and
25 dried for 16 hours at 50 °C in the vacuum drying chamber in a water jet vacuum.

Yield: 89.0 g

Example 5

30 161.1 g (0.11 mol) oligo-[2,2-bis(4-hydroxyphenyl)-propane carbonate] of chlorocarbonic ester (degree of polymerisation approximately 5) (produced according to U.

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Grigo, K. Kirchner and P.R. Müller "Polycarbonate" in Becker/Braun, Kunststoff-Handbuch, Volume 3/1, Polycarbonate, Polyacetale, Polyester, Celluloseester, Carl Hanser Verlag Munich, Vienna 1992, page 143 Formula (3.9)) were dissolved in 1,000 g dichloromethane. A clear solution consisting of 89.1 g (0.189 mol) 2,4,6-
5 triiodophenol, 35.6 g (0.40 mol) 45 % caustic soda solution and 800 g water was added at 20 to 25°C. After 5 min 0.71 g N-ethylpiperidine were added and the mixture was stirred intensively for 30 min. The dichloromethane phase was separated from the aqueous phase and washed free of electrolytes. The solvent was evaporated and the concentrated solution dried in a water jet vacuum at 120°C.

10 Yield: 202 g colourless solid

Analyses: phenolic OH: 160 mg/kg, saponifiable Cl: < 0.2 mg/kg

Iodine content: approximately 27%

Example 6

15

A tetrabromobisphenol-containing oligocarbonate is commercially available under the brand name Great Lakes BC 52.

Example 7

20

The brominated and/or iodised oligo-, poly- and/or copolycarbonates obtained in Examples 1 to 6 (9.5 wt.%) were mixed with polycarbonate based on bisphenol A (Makrolon 2808, Bayer AG) and 0.5 wt.% Tinuvin 234 (2-(3',5'-bis(1,1-dimethylbenzyl)-2'-hydroxy-phenyl)benzotriazole made by Ciba Specialty Chemicals,
25 Basel, Switzerland) as stabiliser in methylene chloride in the conventional manner. A film was then produced and weathered for 200 hours with Xenon-WOM 0.5 W/mm² 102:18. The yellowness index (YI) was measured prior to and after weathering.

In the following example, iodised oligocarbonate from Example 5 was used.

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Unstabilised:	Start (Y.I.): 0.86	200 h (Y.I.): 20.78
Stabilised:	Start (Y.I.): 0.97	200 h (Y.I.): 6.20

5 This clearly shows the stabilisation of the films with to the mixture according to the invention.

The same observation can also be made in toys and medical instruments.

10 The X-ray contrast of these mouldings is so great that they can be seen in children's bodies.

The mixtures can, however, also be processed on an injection moulding machine and, for example, formed into building blocks.

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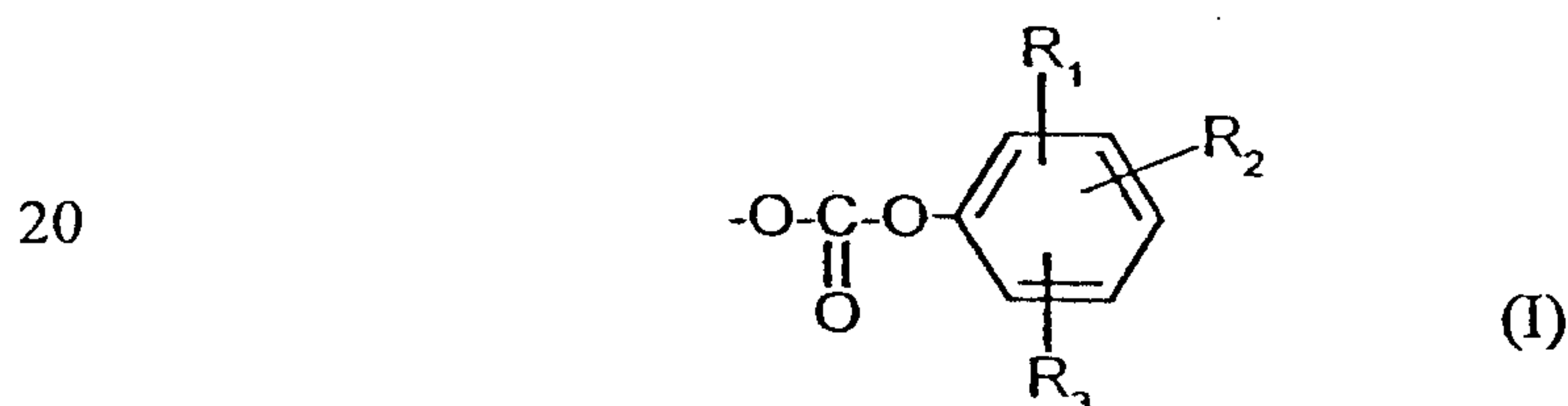
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Claims

1. Use of a mixture of at least one brominated and/or iodised oligo-, poly- and/or copolycarbonate and at least one stabiliser selected from the group comprising 2-(3',5'-bis(1,1-dimethylbenzyl)-2'-hydroxy-phenyl)-benzotriazole, 2-(2'-hydroxy-5'-(*tert*-octyl)-phenyl)-benzo-triazole, 2-(2'-hydroxy-3'-(2-butyl)-5'-(*tert*-butyl)-phenyl)-benzotriazole, bis(3-(2H-benzotriazolyl)-2-hydroxy-5-*tert*-octyl)methane, 2-(4-hexoxy-2-hydroxyphenyl)-4,6-diphenyl-1,3,5-triazine or a further benzotriazole and benzophenones such as 2,4-dihydroxy-benzophenone for producing X-ray contrastable mouldings made from plastics material.

2. Use according to claim 1, characterised in that the brominated and/or iodised oligo-, poly- and/or copolycarbonates are selected from the group comprising those with an \bar{M}_w between 600 and 100,000, preferably between 1,000 and 80,000, particularly preferably between 3,000 and 40,000 and terminal iodine or bromophenylcarbonate groups, preferably terminal groups of general formula (I)



25 wherein

R_1 to R_3 represent H, C_1 - C_{18} optionally branched alkyl, Cl, Br or I providing that at least one of the radicals R_1 , R_2 and R_3 represents I and/or Br.

30

3. Use according to one of the preceding claims, characterised in that the terminal groups are terminal 4-iodophenylcarbonate and 2,4,6-triiodophenylcarbonate groups.

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4. Use according to claim 1, characterised in that oligo-, poly- or copolycarbonates contain iodised and/or brominated diols, preferably iodised or brominated derivatives of hydroquinone, resorcinol, dihydroxydiphenyls, bis(hydroxyphenyl)-alkanes, bis(hydroxyphenyl)-cycloalkanes, bis(hydroxyphenyl)-sulphides, bis(hydroxyphenyl)-ethers, bis(hydroxyphenyl)-ketones, bis(hydroxyphenyl)-sulphones, bis(hydroxyphenyl)-sulphoxides, α,α' -bis(hydroxyphenyl)-diisopropylbenzenes, and compounds thereof alkylated in the nucleus, particularly preferably with iodine and/or bromine atoms on the aromatic nucleus of the diols.
5. Use according to claim 1 and/or 4, characterised in that the iodised and/or brominated diphenols are selected from the group of singly or repeatedly iodised and/or brominated derivatives of 4,4'-dihydroxydiphenyl, 2,2-bis(4-hydroxyphenyl)-propane, 2,4-bis(4-hydroxyphenyl)-2-methylbutane, 1,1-bis(4-hydroxyphenyl)-p-diisopropylbenzene, 2,2-bis(3-methyl-4-hydroxyphenyl)-propane, 2,2-bis(3-chloro-4-hydroxyphenyl)-propane, bis(3,5-dimethyl-4-hydroxyphenyl)-methane, 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)-propane, bis(3,5-dimethyl-4-hydroxyphenyl)-sulphone, 2,4-bis(3,5-dimethyl-4-hydroxyphenyl)-2-methylbutane, 1,1-bis(3,5-dimethyl-4-hydroxyphenyl)-p-diisopropylbenzene, 2,2-bis(3,5-dichloro-4-hydroxyphenyl)-propane, 2,2-bis(3,5-dibromo-4-hydroxyphenyl)-propane and 1,1-bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane.
6. Use according to claim 1 and/or 4 and/or 5, characterised in that the iodised and/or brominated diphenols are selected from the group of singly or repeatedly iodised and/or brominated derivatives of 2,2-bis(4-hydroxyphenyl)-propane, 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)-propane, 2,2-bis(3,5-dichloro-4-hydroxyphenyl)-propane, 2,2-bis(3,5-dibromo-4-hydroxyphenyl)-propane, 1,1-bis(4-hydroxyphenyl)-cyclohexane and 1,1-bis(4-hydroxyphenyl)-3,3,5-trimethylcyclohexane.

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7. Use according to claim 1 and/or 4 and/or 5 and/or 6, characterised in that the iodised and/or brominated diphenols are selected from the group tetrabromobisphenol and/or tetraiodobisphenol, preferably optionally mixed with one another and/or optionally mixed with other diols.

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8. Use according to at least one of the preceding claims, characterised in that the stabiliser is selected from the group comprising benzotriazoles, preferably the group comprising 2-(3',5'-bis(1,1-dimethylbenzyl)-2'-hydroxy-phenyl)-benzotriazole, 2-(2'-hydroxy-5'-(*tert*-octyl)-phenyl)-benzo-triazole, 2-(2'-hydroxy-3'-(2-butyl)-5'-(*tert*-butyl)-phenyl)-benzotriazole, bis(3-(2H-benzotriazolyl)-2-hydroxy-5-*tert*-octyl)-methane.

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9. Use according to at least one of the preceding claims, characterised in that the stabiliser is present in quantities of 0.01 to 10 wt.%, preferably 0.1 to 1 wt.%.

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10. Use according to at least one of the preceding claims, characterised in that the brominated and/or iodised oligo-, poly- and/or copolycarbonates are used in quantities of 0.1 to 50 wt.%, preferably 0.1 to 15 wt.%, particularly preferably 1 to 10 wt.% and more particularly preferably 2 to 7 wt.% relative to the moulding.

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11. Use according to at least one of the preceding claims, characterised in that at least one transparent thermoplastic material, preferably an unhalogenated polycarbonate and/or copolycarbonate is additionally contained in quantities of 85 to 99.9 wt.%, preferably 90 to 99 wt.%, particularly preferably 93 to 98 wt.% relative to the moulding.

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12. Moulded articles, preferably toys and medical articles, particularly preferably toys containing a mixture of at least one brominated and/or iodised oligo-, poly- and/or copolycarbonate and at least one stabiliser selected from the group comprising 2-(3',5'-bis(1,1-dimethylbenzyl)-2'-hydroxy-phenyl)-benzotriazole, 2-(2'-hydroxy-5'-(*tert*-octyl)-phenyl)-benzotriazole, 2-(2'-hydroxy-3'-(2-butyl)-5'-(*tert*-butyl)-phenyl)-benzotriazole, bis(3-(2H-benzotriazolyl)-2-hydroxy-5-*tert*-octyl)-methane, 2-(4-hexoxy-2-hydroxyphenyl)-4,6-diphenyl-1,3,5-triazine and benzophenones such as 2,4-dihydroxy-benzophenone to increase the X-ray contrast.

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