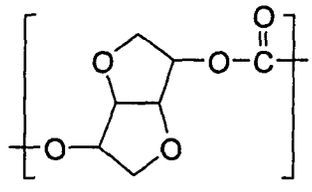
ABSTRACT

It is an object of the present invention to provide a flame retardant resin composition which is obtained from a plant-derived raw material and has high flame retardancy and excellent physical properties and a molded article thereof.

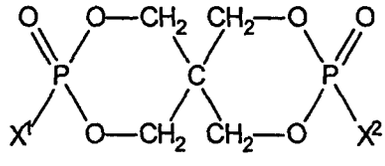
The present invention is a flame retardant resin composition comprising:

100 parts by weight of a resin component (component A) which contains at least 50 wt% of a polycarbonate (component A-1) having a unit represented by the following formula (A-1); and

1 to 100 parts by weight of an organic phosphorus compound (component B) represented by the following formula (1):

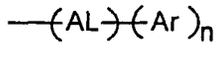


(A-1)



(1)

(in the above formula, X^1 and X^2 are each independently an aromatic substituted alkyl group represented by the following formula (2):



(2)

(in the above formula, AL is a branched or linear aliphatic hydrocarbon group having 1 to 5 carbon atoms, Ar is a phenyl group, naphthyl group or anthryl group, all of which may have a substituent, and may be bonded to any carbon atom contained

in AL, and n is an integer of 1 to 3.)), and a molded article thereof.

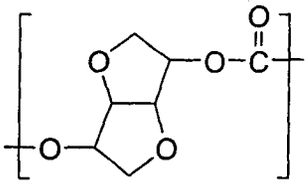
The above flame retardant resin composition has high flame retardancy and excellent physical properties and is obtained from a plant-derived raw material.

CLAIMS

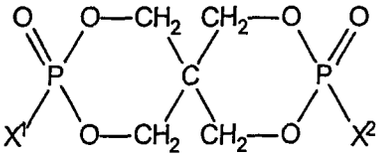
1. A flame retardant resin composition comprising:

100 parts by weight of a resin component (component A) which contains at least 50 wt% of a polycarbonate (component A-1) having a unit represented by the following formula (A-1); and

1 to 100 parts by weight of an organic phosphorus compound (component B) represented by the following formula (1):

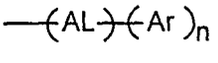


(A-1)



(1)

(in the above formula, X^1 and X^2 are each independently an aromatic substituted alkyl group represented by the following formula (2):



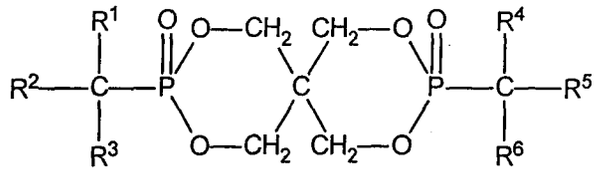
(2)

(in the above formula, AL is a branched or linear aliphatic hydrocarbon group having 1 to 5 carbon atoms, Ar is a phenyl group, naphthyl group or anthryl group, all of which may have a substituent, and may be bonded to any carbon atom contained in AL, and n is an integer of 1 to 3.)).

2. The resin composition according to claim 1, wherein the polycarbonate (component A-1) has a glass transition temperature (Tg) of 100 to 165°C and a 5 % weight loss temperature (Td) of 300 to 400°C.

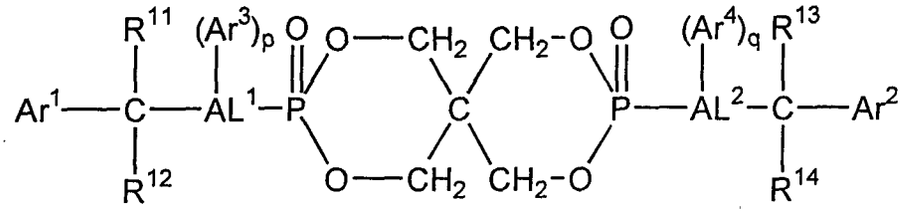
3. The resin composition according to claim 1, wherein the unit represented by the formula (A-1) is a unit derived from isosorbide (1,4:3,6-dianhydro-D-sorbitol).

4. The resin composition according to claim 1, wherein the organic phosphorus compound (component B) is at least one selected from the group consisting of organic phosphorus compounds represented by the following formulas (3) and (4):



(3)

(in the above formula, R^2 and R^5 are each independently a phenyl group, naphthyl group or anthryl group, all of which may have a substituent, and R^1, R^3, R^4 and R^6 are each independently a hydrogen atom, branched or linear alkyl group having 1 to 4 carbon atoms, phenyl group which may have a substituent, naphthyl group which may have a substituent or anthryl group which may have a substituent.)

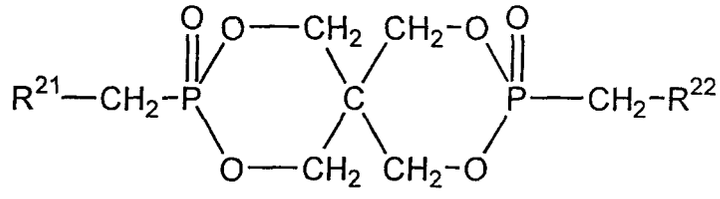


(4)

(In the above formula, Ar^1 and Ar^2 are each independently a phenyl group, naphthyl group or anthryl group, all of which may have a substituent, R^{11}, R^{12}, R^{13} and R^{14} are each independently a hydrogen atom, aliphatic hydrocarbon group having 1 to 3 carbon atoms, phenyl group which may have a substituent, naphthyl group which may have a substituent or anthryl group which may have a substituent, AL^1 and AL^2 are each independently a branched or linear aliphatic hydrocarbon group having 1 to 4 carbon atoms, Ar^3 and Ar^4 are each independently a phenyl group, naphthyl group or anthryl

group, all of which may have a substituent, p and q are each independently an integer of 0 to 3, and Ar^3 and Ar^4 may be bonded to any carbon atoms of AL^1 and AL^2, respectively.)

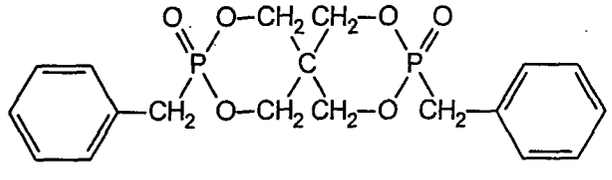
5. The resin composition according to claim 1, wherein the organic phosphorus compound (component B) is represented by the following formula (5):



(5)

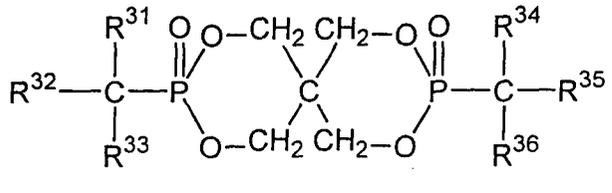
(in the above formula, R^{21} and R^{22} are each independently a phenyl group, naphthyl group or anthryl group, all of which may have a substituent.)

6. The resin composition according to claim 1, wherein the organic phosphorus compound (component B) is a compound represented by the following formula (1-a):



(1-a).

7. The resin composition according to claim 1, wherein the organic phosphorus compound (component B) is represented by the following formula (6):

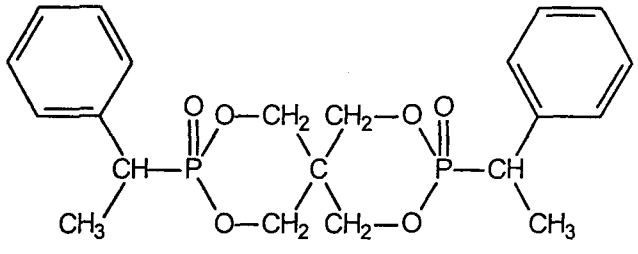


(6)

(in the above formula, R^{31} and R^{34} are each independently a hydrogen atom or aliphatic hydrocarbon group having 1 to 4 carbon atoms, R^{33} and R^{36} are each independently an aliphatic

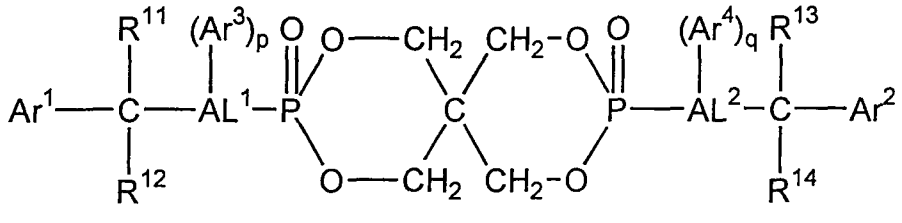
hydrocarbon group having 1 to 4 carbon atoms, and R^{32} and R^{35} are each independently a phenyl group, naphthyl group or anthryl group, all of which may have a substituent.).

8. The resin composition according to claim 1, wherein the organic phosphorus compound (component B) is a compound represented by the following formula (1-b):



(1-b)

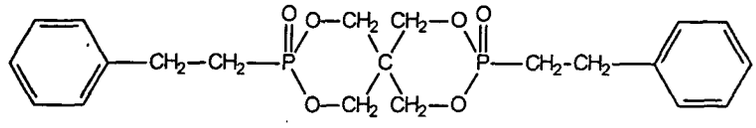
9. The resin composition according to claim 1, wherein the organic phosphorus compound (component B) is represented by the following formula (7):



(7)

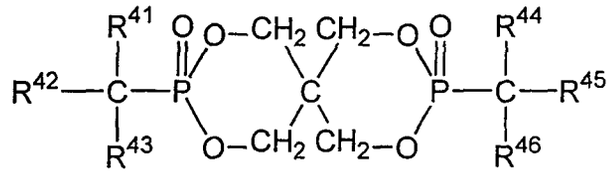
(in the above formula, Ar^1 and Ar^2 are each independently a phenyl group, naphthyl group or anthryl group, all of which may have a substituent, R^{11}, R^{12}, R^{13} and R^{14} are each independently a hydrogen atom, aliphatic hydrocarbon group having 1 to 3 carbon atoms, phenyl group which may have a substituent, naphthyl group which may have a substituent or anthryl group which may have a substituent, AL^1 and AL^2 are each independently a branched or linear aliphatic hydrocarbon group having 1 to 4 carbon atoms, Ar^3 and Ar^4 are each independently a phenyl group, naphthyl group or anthryl group, all of which may have a substituent, p and q are each independently an integer of 0 to 3, and Ar^3 and Ar^4 may be bonded to any carbon atoms of AL^1 and AL^2, respectively.).

10. The resin composition according to claim 1, wherein the organic phosphorus compound (component B) is a compound represented by the following formula (1-c):



(1-c).

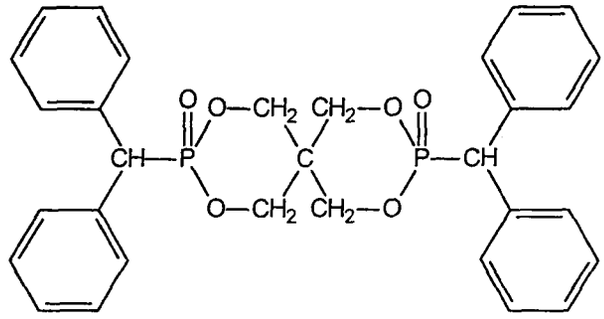
11. The resin composition according to claim 1, wherein the organic phosphorus compound (component B) is represented by the following formula (8):



(8)

(in the above formula, R^{41} and R^{44} are each independently a hydrogen atom, aliphatic hydrocarbon group having 1 to 4 carbon atoms, phenyl group which may have a substituent, naphthyl group which may have a substituent or anthryl group which may have a substituent, and R^{42}, R^{43}, R^{45} and R^{46} are each independently a phenyl group, naphthyl group or anthryl group, all of which may have a substituent.).

12. The resin composition according to claim 1, wherein the organic phosphorus compound (component B) is a compound represented by the following formula (1-d):



(1-d)

13. The resin composition according to claim 1, wherein

the acid value of the organic phosphorus compound (component B) is 0.7 mgKOH/g or less.

14. The resin composition according to claim 1 which can attain at least UL-94 V-2 flame retardancy.

15. The resin composition according to claim 1 which comprises the component B in an amount of 2 to 70 parts by weight based on 100 parts by weight of the component A.

16. A molded article formed from the resin composition of claim 1.

Dated this 20/04/2012

(SHUKADEV KHURAIJAM)
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANT[S]

DESCRIPTION

FLAME RETARDANT RESIN COMPOSITION AND MOLDED ARTICLE THEREOF

Technical Field

The present invention relates to a flame retardant resin composition which is obtained from a plant-derived raw material and has high flame retardancy and excellent physical properties and to a molded article thereof. More specifically, it relates to a substantially halogen-free flame retardant resin composition which comprises a specific organic phosphorus compound and to a molded article thereof.

Background Art

Resins such as polypropylenes (PP), acrylonitrile-butadiene-styrene (ABS), polyamides (PA6, PA66), polyesters (PET, PBT) and polycarbonates (PC) are used as raw materials for obtaining resin molded articles. These resins are produced from raw materials obtained from oil resources. In recent years, problems such as the depletion of oil resources and global environment have been concerned, and the production of a resin from a raw material obtained from biogenic matter such as a plant has been desired. Especially when a global environmental problem is taken into consideration, a resin obtained from a plant-derived raw material is regarded as a resin having a low load on the global environment from the concept "carbon neutral" which means that the balance of carbon is neutral in view of the amount of carbon dioxide absorbed during the growth of a plant even when it is burnt after use.

Meanwhile, to use a resin obtained from a plant-derived raw material as an industrial material, especially an electric/electronic-related part, OA-related part or auto part, flame retardancy must be provided to the resin from