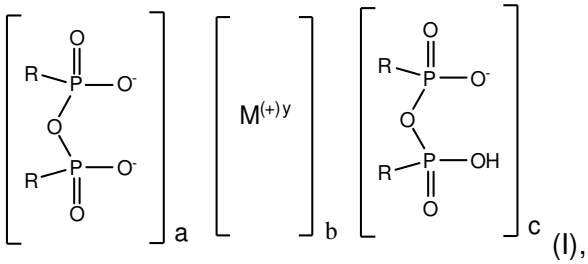
CLAIMS

1. An antimony trioxide free flame retardant thermoplastic composition comprising:

(a) at least one thermoplastic polymer;

(b) at least one brominated flame retardant; and

(c) at least one phosphorus-containing flame retardant of empirical formula (I):



(I),

wherein R is H, an alkyl, aryl, alkylaryl, or arylalkyl group, M is a metal and y is 2 or 3, such that $M^{(+)y}$ is a metal cation where (+)y represents the charge formally assigned to the cation, a, b, and c represent the ratio of the components to which they correspond relative to one another in the compound, and satisfy the charge-balance equation 2(a)+c=b(y), and c is not zero.

2. The antimony trioxide free flame retardant thermoplastic composition of claim 1, wherein the at least one thermoplastic polymer is chosen from the group consisting of polyesters and polyamides.

3. The antimony trioxide free flame retardant thermoplastic composition of claim 2, wherein the at least one thermoplastic polymer is a polyester chosen from polyalkylene terephthalates, preferably poly(ethylene terephthalate), poly(1,3-trimethylene terephthalate), poly(1,4-butyleneterephthalate) and mixtures thereof.

4. The antimony trioxide free flame retardant thermoplastic composition of claim 2, wherein the at least one thermoplastic polymer is a polyamide chosen from the group consisting of polyamide-4,6, polyamide-6, polyamide-6,6, polyamide-6,10, polyamide-6,12, polyamide-11, polyamide-12 and mixtures thereof.

5. The antimony trioxide free flame retardant thermoplastic composition of claim 2, wherein the at least one thermoplastic polymer is a polyamide chosen from the group consisting of polyamide-4,T, polyamide-MXD,6, polyamide-12,T, polyamide-10,T, polyamide-9,T, polyamide-6,T/6,6, polyamide-6,T/D,T, polyamide-6,6/6,T/6,I, polyamide-6/6,T, polyamide-6,T/6,I, and mixtures thereof.

6. The antimony trioxide free flame retardant thermoplastic composition according to any one of the preceding claims, wherein the at least one brominated flame retardant is chosen from the group consisting of decabromodiphenyl oxide, decabromodiphenyl ethane,

tetrabromobisphenol A, tetrabromobisphenol A bis (2,3-dibromopropyl ether), tris(tribromophenoxy)triazine, tris(tribromoneopentyl) phosphate, brominated polyacrylate, brominated polystyrene, polybromostyrene, brominated epoxy polymers, end capped brominated epoxy polymers, phenoxy-terminated carbonate oligomer of tetrabromobisphenol A, tetradecabromodiphenoxybenzene, ethylenebistetrabromophthalimide, tetrabromobisphenol S bis (2,3-dibromopropyl ether), poly-dibromophenylene oxide, brominated styrene-butadiene-styrene copolymers, 2-ethylhexyl tetrabromophthalate ester and bis(tribromophenoxy) ethane.

7. The antimony trioxide free flame retardant thermoplastic composition according to any one of the preceding claims, wherein a is 0, 1 or 2, b is from 1 to 4 and c is 1 or 2.

8. The antimony trioxide free flame retardant thermoplastic composition of claim 7, wherein y is 3, a is 1, b is 1 and c is 1.

9. The antimony trioxide free flame retardant thermoplastic composition of claim 8, wherein M is chosen from Al, Ga, Sb, Fe, Co, B, and Bi, preferably Al or Fe.

10. The antimony trioxide free flame retardant thermoplastic composition according to any one of the preceding claims, wherein R is H, C_{1-12} alkyl, C_{6-10} aryl, C_{7-18} alkylaryl, or C_{7-18} arylalkyl, wherein the alkyl, aryl, alkylaryl, or arylalkyl are unsubstituted or are substituted by halogen, hydroxyl, amino, C_{1-4} alkylamino, di-C_{1-4} alkylamino, C_{1-4} alkoxy, carboxy or C_{2-5} alkoxycarbonyl, preferably unsubstituted C_{1-12} alkyl, C_6 aryl, C_{7-10} alkylaryl, or C_{7-10} arylalkyl, more preferably unsubstituted C_{1-6} alkyl, most preferably methyl, ethyl, propyl, isopropyl, butyl, and t-butyl.

11. The antimony trioxide free flame retardant thermoplastic composition according to any one of claims 1-6, wherein M is Al, y is 3, a is 1, b is 1 and c is 1.

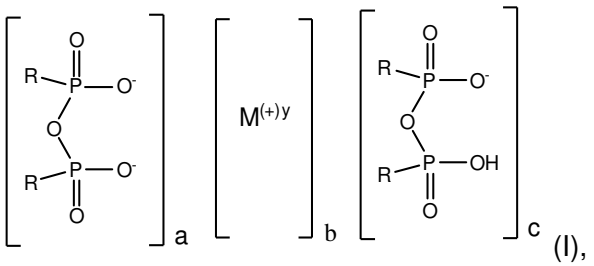
12. The antimony trioxide free flame retardant thermoplastic composition of claim 11, wherein R is H or C_{1-6} alkyl.

13. The antimony trioxide free flame retardant thermoplastic composition of claim 12, wherein R is chosen from methyl and ethyl.

14. The antimony trioxide free flame retardant thermoplastic composition according to any one of the preceding claims, further comprising an inorganic filler, preferably glass fiber.

15. A flame retarded article comprising the antimony trioxide free flame retardant thermoplastic composition according to any one of the preceding claims.

16. A method of making a flame retardant thermoplastic composition comprising blending (a) at least one thermoplastic polymer;
(b) at least one brominated flame retardant; and
(c) at least one phosphorus-containing flame retardant of empirical formula (I)



(I),

wherein R is H, an alkyl, aryl, alkylaryl, or arylalkyl group, M is a metal and y is 2 or 3, such that $M^{(+)y}$ is a metal cation where (+)y represents the charge formally assigned to the cation, a, b, and c represent the ratio of the components to which they correspond relative to one another in the compound, and satisfy the charge-balance equation 2(a)+c=b(y), and c is not zero.

17. A method of making a flame retarded article comprising molding the antimony trioxide free flame retardant thermoplastic composition according to any one of claims 1-14.

18. The method of claim 17, wherein the antimony trioxide free flame retardant thermoplastic composition is injection molded.