molding compounds and in the injection molding of flame-retardant polymer moldings and simultaneously exhibit good flame retardancy.

Summary

In one aspect, there is provided a flame retardant mixture comprising 99.9999% to 0.0001% by weight of dialkylphosphinic salts as component A) and 0.0001% to 13% by weight of iron as component B), where the sum total of a) and b) is 100% by weight.

In another aspect, there is provided a process for producing flame retardant mixtures as described herein, which comprises

a) in a process stage 1 adding 0.9 to 1.1 molecules of olefin per P onto a water-soluble salt of the hypophosphorous acid or the acid itself,

b) in a process stage 2 adding 0.9 to 1.1 additional molecules of olefin per P onto the intermediate from a) to give dialkylphosphinic acid or salt thereof,

c) in a process stage 3 adding 1 to 9 further olefin molecules onto 0% to 20% of the dialkylphosphinate molecules from process stage 1, so as to form telomers, with conversion of dialkylphosphinic acid, if it is formed, to a corresponding salt,

d) in a process stage 4 conducting a crystallization of the intermediate from b) and/or c) and a metal salt,

e) in a process stage 5 mixing in an iron compound/component B.

In another aspect, there is provided the use of flame retardant mixtures as described herein as an intermediate for further syntheses, as a binder, as a crosslinker or accelerator in the curing of epoxy resins, polyurethanes and unsaturated polyester resins, as polymer stabilizers, as crop protection compositions, as sequestrants, as a mineral oil additive, as an anticorrosive, in washing and cleaning composition applications, and in electronics applications; as flame retardants, as flame retardants for clearcoats and intumescent coatings, as flame retardants for wood and other cellulosic products, as reactive and/or nonreactive flame retardant for polymers, for production of flame-retardant polymer molding compounds, for production of flame-retardant polymer moldings and/or for rendering polyester and pure and blended cellulose fabrics flame-retardant by impregnation.

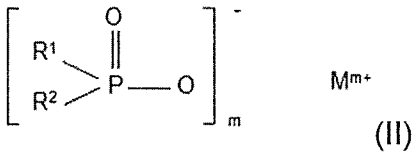
In another aspect, there is provided a flame-retardant thermoplastic or thermoset polymer molding composition or polymer molding, film, filament or fiber comprising 0.5% to 50% by weight of flame retardant mixtures as described herein, 0.5% to 95% by weight of thermoplastic or thermoset polymer or mixtures thereof, 0% to 55% by weight of additives and 0% to 70% by weight of filler or reinforcing materials, where the sum of the components is 100% by weight; and where the polymer comprises thermoplastic polymers of the HI (high-impact) polystyrene, polyphenylene ether, polyamide, polyester or polycarbonate type, and blends or polymer blends of the ABS (acrylonitrile-butadiene-styrene) or PC/ABS (polycarbonate/acrylonitrile-butadiene-styrene) or PPE/HIPS (polyphenylene ether/HI polystyrene) polymer type, and/or thermoset polymers of the formaldehyde-, epoxide- or melamine-phenolic resin polymer, unsaturated polyester, epoxy resin and/or polyurethane type.

The invention therefore relates to a flame retardant mixture comprising
99.9999% to 87% by weight of diorganylphosphinic acid salts as component A) and
0.0001% to 13% by weight of iron as component B),
where the sum total of A) and B) is 100% by weight.

The iron may be present in the form of iron itself, i.e. in elemental form. However, the iron is preferably in the form of a substance containing iron, i.e. of an iron compound or iron alloy.

The invention therefore likewise relates to a flame retardant mixture comprising
99.9999% to 75% by weight of diorganylphosphinic acid salts as component A) and
0.0001% to 13% by weight of iron in the form of an iron-containing substance B1) as component B), where the amount of B1) is 0.0001% to 25% by weight and
where the sum total of A) and B1) is 100% by weight.

The diorganylphosphinic salts preferably conform to the formula (II)



(II)

where

R^1 and R^2 are the same or different and are C_1-C_{18}-alkyl in linear, branched or cyclic form, C_6-C_{18}-aryl, C_7-C_{18}-arylalkyl and/or C_7-C_{18}-alkylaryl,

m is 1 to 4 and

M is Mg, Ca, Al, Sb, Sn, Ge, Ti, Zr, Zn, Ce, Bi, Sr, Mn, Li, Na and/or K.