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Brief Introduction of Zinc Borate

Zinc Borate CAS:1332-07-6 Molecular formula :HBO_3Zn Molecular weight:125.2261 White triclinic crystal or amorphous powder, slightly soluble in water, crystal insoluble in hydrochloric acid, amorphous powder is soluble in hydrochloric acid. Good thermal stability. Easy to disperse. Non-toxic. Zinc borate is mainly used as inorganic additives and non-toxic flame retardants in plastics, rubber, textiles, coatings and other industries.

Flame Retardant Mechanism of Zinc Borate

The flame retardant effect of borate mainly comes from the following aspects:

1）Form glass Inorganic Expansion Coating；

2）promote carbon formation；

3）hinder the escape of volatile combustibles；

4）Dehydration at high temperature and has the functions of heat absorption, foaming and dilution of combustibles. The flame retardant mechanism of zinc borate hydrate is that zinc borate decomposes and releases crystalline water when the temperature is higher than 300 ℃, which plays an endothermic cooling role and dilutes oxygen in the air. On the other hand, at high temperature, zinc borate decomposes into B_2O_3 (If the material contains chlorine or bromine, ZnX_2 and ZnOX are also formed. X is Cl or Br), which adheres to the surface of the polymer to form a layer of coating, which can inhibit the production of flammable gases and also prevent oxidation and thermal decomposition. In addition, in halogen-containing materials, BX_3 is also produced during combustion, BX_3 react with water in gas phase to form HX, and halogen atom free radicals are formed in flame. The free radicals can prevent the chain reaction of hydroxyl free radicals and thus play a flame retardant role.

Main Indicators of Zinc Borate

Testing items	Index		
	Excellent quality	First grade	Qualified products
Whiteness	99	95	93
Exterior water	≤0.5%	≤1%	≤1.5%
Particle size, um（≤）	3	5	5
Zinc oxide ZnO, %	37	40	43
Boron oxide B_2O_3 , %	45	48	50
Melting point ℃	980	980	980
Fineness (325 Sieve residue)，% ≤	0.1	-	-
Temperature of lost crystal water ℃ >	320		
Note: Water content is subject to factory inspection.			

Application of Zinc Borate

1、As a multi-functional synergistic additive of antimony oxide or other halogen Flame retardants , it can effectively improve flame retardancy , reduce smoke generation during combustion, and adjust the chemical, mechanical and electrical properties of rubber and plastic products.

2、As a partial or completely environmentally friendly substitute for halogen-containing flame retardants, it is widely used in the processing of plastics and rubber, such as PVC, PE, PP, reinforced polyamide, polychloride, polystyrene, epoxy resin, polyvinyl ester resin and natural rubber, styrene butadiene rubber, chloroprene rubber, etc.

3、Used in the production of paper , fibre fabric , decorative board, floor leather, wallpaper, carpet, ceramic glaze, bactericide and paint to improve the flame retardant performance.

4、Also be used in the fields of anti-corrosion , far infrared absorption, wood insect prevention and bacterial treatment, etc.

Zinc borate is an environmentally friendly non-halogen flame retardant. It is non-toxic, low water solubility , high thermal stability , small particle size , small specific gravity and good dispersibility . As an efficient flame retardant, zinc borate is widely used in plastics, rubber, coatings and other fields.