

# Flame Retardant Mechanism of Flame Retardant Hot Melt Adhesive Film

Detail Introduction :

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The flame retardant hot melt adhesive film needs to be added with an additive such as a flame retardant during production so that the hot melt adhesive film has a flame retardant effect. So why do flame retardants have the effect of flame retardant? This requires an understanding of the flame retardant mechanism of flame retardants.

The mechanism of action of flame retardants is relatively complex, and the academic community is not very clear. But we know that combustion is actually a very violent chemical reaction, so we can explain the flame retardant mechanism of flame retardants from the conditions under which the chemical reaction occurs.

Flame retardants exert their flame retardant effect through several mechanisms, such as endothermic effect, covering effect, inhibition of chain reaction, suffocation effect of non-combustible gas, etc.

### 1. Endothermic flame retardant

The heat released by combustion is limited. If part of the heat can be absorbed and released in a short time, the temperature of the flame will be reduced, and the heat radiated to the combustion surface and used to crack the gasified combustible molecules into free radicals will be reduced. Will be reduced, and the combustion reaction will be inhibited to a certain extent. For example, the flame retardant mechanism of  $\text{Al}(\text{OH})_3$  flame retardant is to increase the heat capacity of the polymer so that it absorbs more heat before reaching the thermal decomposition temperature, thereby improving its flame retardant performance. Flame retardants give full play to their heat-absorbing properties when combined with water vapour, improving their own flame retardant capabilities.

### 2. Cover flame retardant

After adding the flame retardant to the combustible material, the flame retardant can form a glass-like stable foam cover at high temperature, isolate oxygen, and have the functions of heat insulation, oxygen isolation, and preventing the escape of combustible gas so as to achieve flame retardant Purpose. For example, when the organic phosphorus flame retardant is heated, it can produce a cross-linked solid substance or a carbonized layer with a more stable structure. On the one hand, the formation of the carbonized layer can prevent the polymer from further pyrolysis, and on the other hand, it can prevent

internal thermal decomposition products from entering the gas phase to participate in the combustion process.

### 3. Inhibit chain reaction flame retardant

According to the chain reaction theory of combustion, it is free radicals needed to maintain combustion. A flame retardant can act on the gas phase combustion zone to capture the free radicals in the combustion reaction, thereby preventing the spread of the flame, reducing the flame density in the combustion zone, and finally reducing the combustion reaction speed until it is terminated. For example, halogen-containing flame retardants have the same or similar evaporation temperature as the polymer decomposition temperature. When the polymer is thermally decomposed, the flame retardant also volatilizes at the same time. At the same time, the halogen-containing flame retardant and the thermal decomposition product are in the gas phase combustion zone at the same time, and the halogen can capture the free radicals in the combustion reaction and interfere with the chain reaction of the combustion.

### 4. Asphyxiating flame retardant

When the flame retardant is heated, it decomposes into a non-combustible gas, and the concentration of combustible gas from the decomposition of the combustible material is diluted to below the lower limit of combustion. At the same time, it also has the effect of diluting the oxygen concentration in the combustion zone, preventing the continuation of the combustion and achieving the effect of flame retardant.

The above are the four common mechanisms for flame retardants to exert their flame retardant effect. In practical application, flame retardants achieve the purpose of flame retardant through the joint action of several mechanisms rather than relying on a single flame retardant mechanism. Therefore, the flame retardant mechanism of flame retardants in practical application is complicated.

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