

Flame Retardant Compound "STOX-501"

1. Abstract

STOX-501 is a flame retardant compound of natural minerals and antimony trioxide. STOX-501 can be used for PVC or plastics with halogenated flame retardant. Its flame retardancy is virtually the same as antimony trioxide. STOX-501 is the economical flame retardant because of its low price.

2. Physical Property and Typical Analysis

Table 1 STOX-501 Typical data

Inspection item	Unit	Observed data
Sb ₂ O ₃	wt%	49.7
SiO ₂	wt%	30.4
Al ₂ O ₃	wt%	7.9
Fe ₂ O ₃	wt%	4.3
As	wt%	0.01
Pb	wt%	0.03
+45μm	ppm	13
Bulk Density	g/cm ³	0.5
Color L*		86

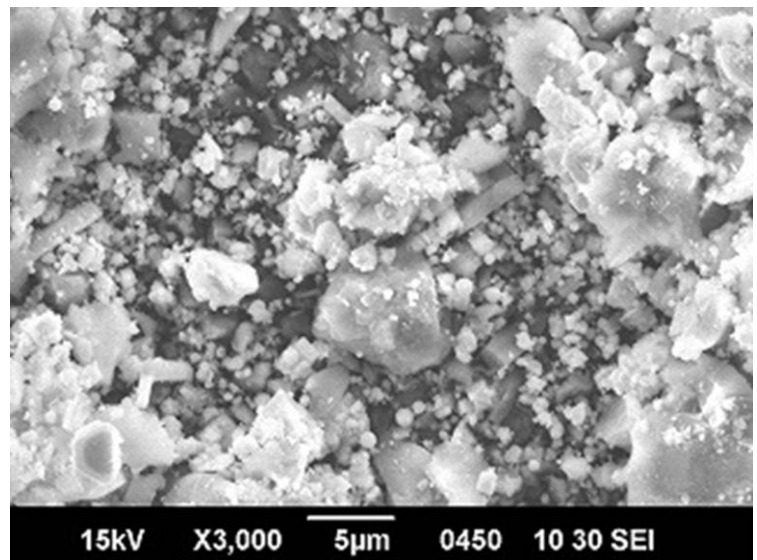


Fig.1 STOX-501 SEM Photograph

*Typical data is not guaranteed data but observed data

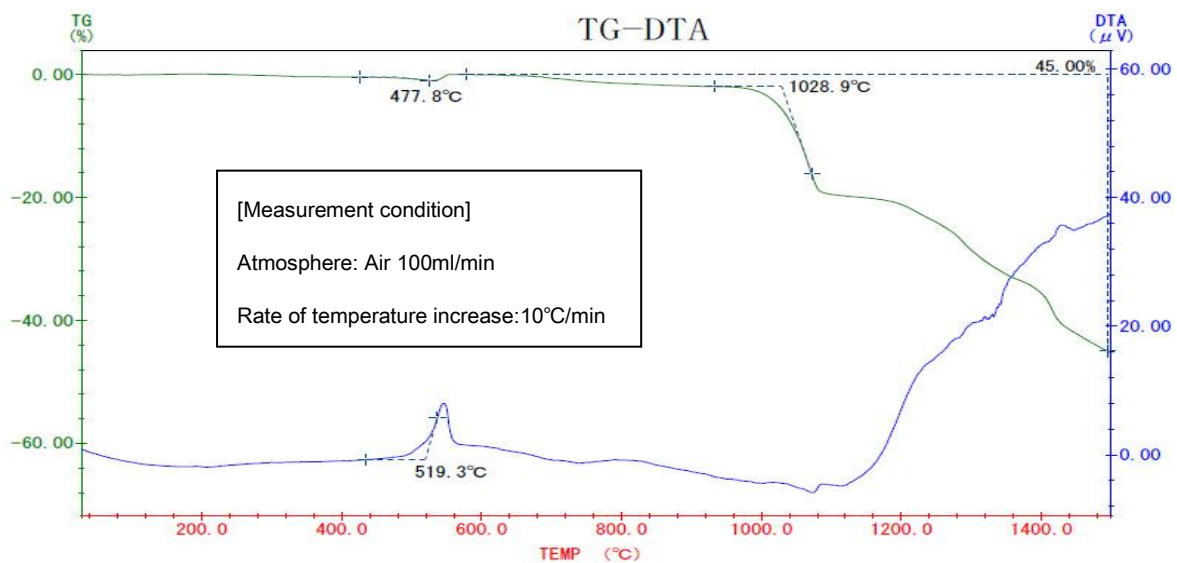


Fig. 2 STOX-501 Thermal analysis

3. Particle Size Distribution

STOX-501 includes natural minerals but coarse mineral particles which reduce strength of plastics are cut out by fine grinding and classification.

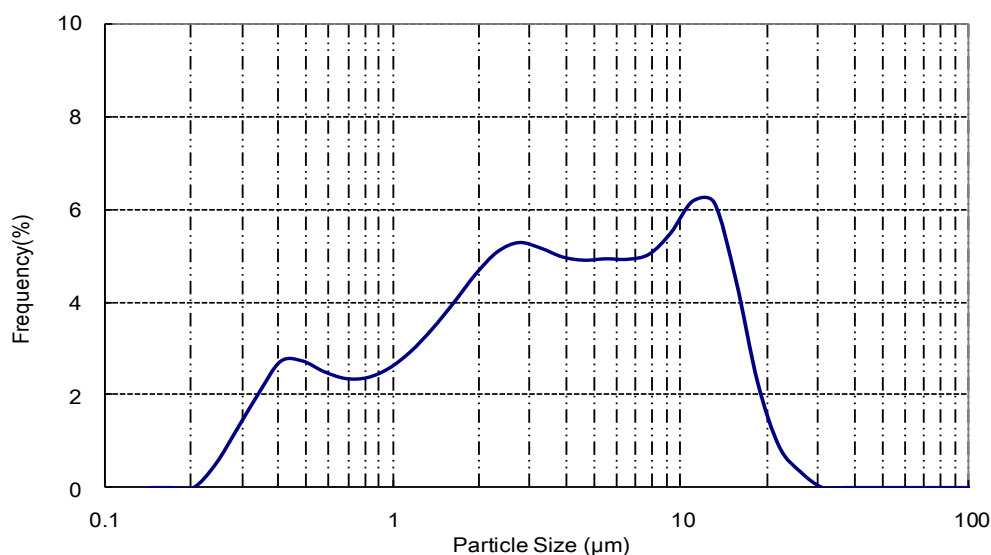


Fig. 3 STOX-501 Particle size distribution

4. Flame Retardant Property

If antimony trioxide is totally replaced with STOX-501 as additive to flexible PVC, its flame retardancy is virtually the same as antimony trioxide (Table 2 and Fig. 4).

Table 2 Compounded resin and flame retardant test

Sample Name	PVC*1	Additive			Oxygen index*2	UL-94	UL-94
		DOP	Stabilizer	Flame retardant		(1mm)	(2mm)
Blank Plastic resin	100 phr	50 phr *4	6 phr	-	26.5%	V-1 (39sec *3)	V-0 (22sec)
Antimony trioxide Compounded resin	100 phr	50 phr	6 phr	Antimony trioxide 4 phr	30.5%	V-0 (3sec)	V-0 (1sec)
STOX-501 Compounded resin	100 phr	50 phr	6 phr	STOX-501 4 phr	30.2%	V-0 (8sec)	V-0 (3sec)

*1 Cl content of PVC ; 56.8w% *2 Oxygen Index ; JIS K 7201 compliance *3 Combustion time of five test pieces

*4 phr ; Plastic and rubber as the weight of 100, shows a number to the weight of other materials. p=per, h=hundred, r=resin or rubber

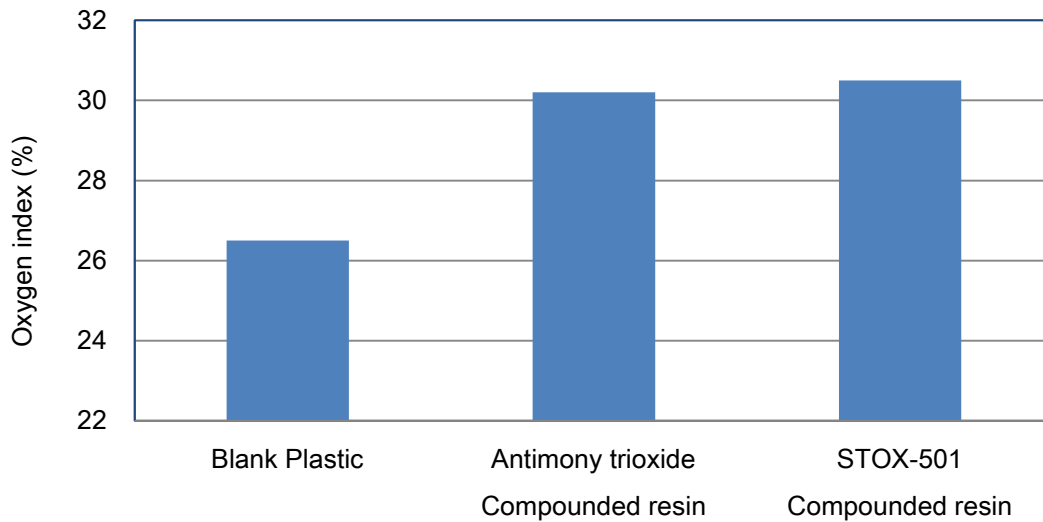


Fig.4 Oxygen index

Electrical Property

STOX-501 does not affect the original electrical property of plastics (Table 3).

Therefore STOX-501 can be used for the electronic components which electrical property is important.

Table 3 Electrical Property

Sample Name	PVC	Additive			Volume resistivity *
		DOP	Stabilizer	Flame retardant	
Blank Plastic resin	100 phr	40 phr	6 phr	-	$1.6 \times 10^{11} \Omega \text{cm}$
Antimony trioxide Compounded resin	100 phr	40 phr	6 phr	Antimony trioxide 4 phr	$2.1 \times 10^{11} \Omega \text{cm}$
STOX-501 Compounded resin	100 phr	40 phr	6 phr	STOX-501 4 phr	$1.7 \times 10^{11} \Omega \text{cm}$

* Volume resistivity : JIS K6723 compliance

* The statement and methods presented herein about the products are based upon the best available data and practices currently known to us. However they are neither presentations nor warranties of performance, results or comprehensiveness of such data, and further. They do not imply any recommendation to infringe any patent or offer of a license under any license.



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