

Zinc Sulfide (ZnS)

Zinc Sulfide (ZnS) stands at the forefront of advanced material science, offering more than just an additive—it is a multi-functional performance solution engineered to meet the complex demands of modern manufacturing. By harmonizing high-efficiency whitening with effective halogen-free flame retardancy in a single, inherently stable compound, ZnS redefines what is possible in polymer formulation. It empowers you to streamline ingredient lists, enhance product safety and appearance, and achieve stricter environmental standards, all without compromising on processability or cost-effectiveness. This is additive intelligence—designed to perform, built to sustain, and crafted to advance your innovations.

Key Advantages

- **Optical & Material Performance**
 - Blue-tint white pigment for enhanced whiteness and brightness
 - Superior dispersion and tinting strength for uniform color development
- **Processing Benefits**
 - Extremely low hardness reduces screw and barrel wear
 - Excellent thermal stability and good thermal conductivity for high-heat applications
- **Durability & Safety**
 - Prevents photocatalytic and metal-ion-induced degradation, improving long-term stability
 - Supports flame-retardant and smoke-suppression performance
- **Regulatory Compliance**
 - Fully REACH-compliant
 - Heavy-metal-free and environmentally preferred

Applications

Zinc Sulfide (ZnS) is used across a broad range of polymer systems and performance-critical applications, including:

- General-purpose polymers (PE, PP, PVC, EVA) – Enhances whiteness, opacity, and long-term stability while maintaining smooth processing behavior.
- Engineering plastics (PA, PBT, PC, PPS) – Provides high brightness, controlled opacity, and stable dispersion for consistent mechanical and optical properties.
- Elastomers and flexible polymers (TPU, TPE, rubber) – Helps prevent brittleness by reducing degradation pathways and improving durability.
- Coatings and paints – Improves whiteness, UV stability, and infrared reflectivity for durable, weather-resistant finishes.
- Glass-fiber reinforced compounds – Maintains color uniformity and stability under high-temperature processing and reinforcing conditions.
- Friction materials, ceramics, and high-performance composites – Offers thermal stability, wear resistance, and controlled optical behavior for demanding industrial formulations.
- Flame-retardant systems – Functions as a synergistic extender and partial replacement for Sn₂O₃,

鑫泰合化工（广东）有限公司

SINTAH CHEMICALS (GUANGDONG) COMPANY LIMITED

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supporting flame-retardant performance and formulation stability.

Product Available

Two Zinc Sulfide Grades Available

- LS-A26: Whiteness ≥ 96 , comparable to leading benchmark grades
- LS-397: Whiteness ≥ 94 , suitable for cost-efficient formulations

Only difference: Whiteness level - all other performance properties are the same

Why Choose Sintah Chemicals' ZnS?

Innovative Manufacturing Process: Our cutting-edge calcination and purification process ensures:

- Precision-controlled temperature profiles for optimal crystal structure.
- Removal of metal ion impurities, enhancing weather resistance and whiteness.
- Strict quality control for purity, stability, and performance consistency.

Sintah Chemicals' Zinc Sulfide outperforms traditional white pigments, offering a high-value solution that combines technical excellence with economic benefits. As industries seek advanced materials to meet environmental and performance challenges, Our ZnS stands out as a reliable and innovative choice.

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Regulatory Notes

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ZINC SULFIDE FLAME RETARDANT PERFORMANCE COMPARATIVE ANALYSIS

Zinc sulfide (ZnS) is an important inorganic compound with broad applications in materials science, among which its use as a flame retardant and flame-retardant synergist is particularly notable. Owing to its good thermal stability and excellent optical properties, ZnS is often employed in functional composite materials such as plastics, rubbers, coatings, adhesives, and electronic components. In flame-retardant applications, ZnS primarily functions through the following mechanisms:

- Synergistic flame-retardant effect:** Zinc sulfide can be used in combination with halogen-based flame retardants and others to produce a synergistic flame-retardant effect. This synergistic system not only improves the flame-retardant efficiency of the material under fire conditions but also effectively suppresses the release of toxic smoke and harmful gases during combustion.
- Alternative to antimony trioxide (Sb₂O₃):** In certain polymer systems (such as nylon), ZnS can serve as a partial or complete environmentally friendly substitute for the traditional flame-retardant synergist Sb₂O₃. While maintaining the flame-retardant rating of the material, it helps reduce potential impacts on the ecological environment and human health.
- Enhancing thermal stability of materials:** The addition of ZnS can improve the thermal stability of composite materials, delay the thermal degradation process of the matrix, and thereby indirectly enhance the material's resistance to combustion under high temperatures or fire exposure.

COMPARATIVE FLAME-RETARDANT PERFORMANCE ACROSS PLASTIC TYPES

Plastic Type	Flame Retardant Loading (%)	Flame Retardant					
		100% Sb ₂ O ₃		50% Sb ₂ O ₃ / 50% ZnS		100% ZnS	
		Oxygen Index (%)	UL-94 Rating	Oxygen Index (%)	UL-94 Rating	Oxygen Index (%)	UL-94 Rating
PVC-U	3	46	V0	50.9	V0	46.6	V0
PVC-P	5	26.5	V0	28.2	V0	24	V1
PVC Paste	8	27.5	V0	27.5	V0	22	V2
HDPE*	5	29.5	**	29.5	**	24.5	**
PP*	5	24.5	**	25.5	**	23.5	**
PS*	5	--	**	24.5	**	25	**
PA-6*	5	27	V0	24	V2	25	V1
PET*	5	39	V0	38	V0	32	V0
ABS*	5	26	V0	23	V0	21	**

Test Protocol: ASTM D2863

Remark:

- * 10% brominated diphenyl ethers added as basic Flame Retardant and Sn203 (and other) acting as flame retardant synergist to reduce the use of brominated diphenyl ethers.

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** No information provided by UL-94

RESULTS ANALYSIS AND DISCUSSION

Table 2 presents the Oxygen Index test results and UL-94 flammability ratings for flame retardant systems using solely ZnS, solely Sb₂O₃, or an equal mixture of both, in various plastic matrices.

The results indicate that replacing 50% of Sb₂O₃ with ZnS generally maintains the same UL-94 flame retardancy rating for most plastics, with the exception of PA-6. In PA-6, partial substitution (50% ZnS) leads to a decrease in performance (UL-94 V2), while using 100% ZnS results in better performance (UL-94 V1).

For PVC, PP, and PS, the use of 50% ZnS as a replacement for Sb₂O₃ leads to an increase in the Oxygen Index, suggesting an improved flame retardant effect.

Based on the combined Oxygen Index and UL-94 test results, the feasibility of replacing Sb₂O₃ with ZnS is summarized as follows:

- **PVC-U**: Can be 100% replaced.
- **PVC-P**: Can be 75% replaced.
- **PVC Paste**: Can be 50% replaced.
- **HDPE**: Can be 50% replaced.
- **PP**: Can be 50% replaced.
- **PS**: Can be 100% replaced.
- **PA-6**: Partial replacement is not recommended; complete replacement can be considered.
- **PET**: Can be 50% replaced.
- **ABS**: Replacement is not recommended.

COMPREHENSIVE PERFORMANCE EVALUATION

From the perspective of combined whitening and flame retardant functionality, the experiments demonstrate that ZnS can partially or completely replace Sb₂O₃ as a flame retardant.

ZnS itself is a white pigment, imparting a bright tone to materials. Its whitening power is approximately equivalent to 60% that of titanium dioxide (TiO₂). Therefore, using ZnS as a flame retardant in a formulation allows for a corresponding reduction in the amount of TiO₂ required, optimizing both cost and performance.

Furthermore, ZnS is non-toxic and environmentally friendly, making it suitable for use in plastic systems such as polyvinyl chloride (PVC) and compliant with current environmental regulations for flame retardant additives.

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Zinc Sulfide (ZnS) vs. Titanium Dioxide (TiO₂)

Property	ZnS	TiO ₂	ZnS Advantage
Mohs hardness	Low	High	Reduce wear and tear on equipment and protect processing machinery
Photocatalytic Activity	No	Yes	Does not cause polymer degradation and improves weather resistance
UV transmissibility	Selective Transimission	Strong Scattering	Optimized for UV curing applications, enhance cure depth
Thermal Conductivity	High	Low	Enhance heat dissipation for electronic device.
Metal Ion Effects	Anchoring Effect	No	Inhibits catalytic degradation, prolonging product lifespan.
ECO-friendly	No Heavy Metal	Contains Titanium	Better aligns with environmental protection regulations.

SINTAH Chemicals' Zinc Sulfide outperforms traditional white pigments across multiple dimensions, offering customers high-performance, high-value-added solutions through its unique combination of properties. From both technical and economic perspectives, SINTAH's ZnS marks a significant advancement in white pigment technology, unlocking new possibilities for material innovation across industries. As environmental regulations become increasingly stringent and demand for high-end applications continues to rise, SINTAH ZnS' comprehensive advantages will become even more evident, ensuring broad market potential.

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ZINC SULFIDE: LS – A26

Item	Typical Value
Appearance	White powder
CAS No.	1314-98-3
Applications	Plastic, Rubber, Coating, inks, Flame Retardant, Friction Materials, Paper, etc.
Particle Size (D50, μm)	≤ 1
Heating Loss (%)	≤ 1
Whiteness (%)	≥ 96
Content (%)	≥ 97
Hiding Rate (TiO ₂ =100, PVC=17%)	54-55
Residue on Sieve (45 μm , %)	≤ 0.004
Mohs Hardness	3

PERFORMANCE FEATURES

- Whiteness ≥ 96 with a clean blue-white tone
- Strong intrinsic whitening power; enhances brightness and color purity
- Excellent dispersibility and wetting behavior
- High thermal stability (up to 350 °C)
- Very low abrasion due to low hardness; reduces wear on dies and screws
- Compatible with glass-fiber-reinforced polymers
- High thermal conductivity
- Does not inhibit catalytic oxidation (unlike TiO₂)
- Improves weatherability in plastics
- Enhances mechanical performance in UV-cured coatings.

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PACKAGING

- 25kg/pack; Customized packaging is available.

STORING

- Avoid dampness and sunshine. Shelf Life: 24 months

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ZINC SULFIDE: LS - 397

Item	Typical Value
Appearance	White powder
CAS No.	1314-98-3
Applications	Plastic, Rubber, Coating, inks, Flame Retardant, Friction Materials, Paper, etc.
Particle Size (D50, μm)	≤ 1
Heating Loss (%)	≤ 1
Whiteness (%)	≥ 94
Content (%)	≥ 97
Hiding Rate (TiO ₂ =100, PVC=17%)	54-55
Residue on Sieve (45 μm , %)	≤ 0.004
Mohs Hardness	3

PERFORMANCE FEATURES

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