

Invited Talk

Architecture of Carbon Black and Its Impact on Paint-Coating Applications

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ABSTRACT

Carbon black plays a crucial role in modern paint and coating systems due to its ability to impart deep color, enhance UV protection, and improve overall film performance. Its effectiveness is strongly influenced by its architecture, which includes primary particle size, surface area, the degree of aggregation, aggregate size distribution, porosity, and surface chemistry. Smaller particles and smaller structured aggregates contribute to deeper blackness, stronger tinting strength, and improved UV shielding. In contrast, carbon blacks with larger structure and larger particle promote better dispersion. Surface treatments and functional groups also influence dispersion stability, resin compatibility, and long-term durability. This topic describes how tailored carbon black architecture can be strategically selected to optimize color intensity, surface appearance, mechanical stability, and protective performance in coating applications. Understanding these structure–property relationships enable formulators to design modern paints and coatings that meet specific aesthetic and functional requirements.

Keywords: Carbon black; particle architecture; paint coatings; tinting strength; dispersion; surface chemistry.

