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Color prediction model for pre-colored fiber blends based on modified Stearns-Noechel function

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Abstract

The goal of this work is to propose a color prediction model for pre-colored fiber blends with high accuracy. The transfer function plays a vital role in an additive color mixing model. The better linearity between the transfer function and mass proportion, the higher accuracy of the model. However, the well-known Stearns-Noechel transfer function does not always hold good linearity, causing inaccurate color matching in many cases. Aiming at compensating the poor linearity, a new transfer function was established by minimizing the linear deviation. The proposed transfer function was applied to the additive model for color prediction of pre-colored fiber blends. The prediction accuracy of the proposed model was assessed by 44 samples. The average color difference was 0.63 CIEDE2000 unit, which was significantly better than the results of the Stearns-Noechel model (~1.23) and the two-constant Kubelka-Munk model (~1.11). These results indicate the proposed model has higher color prediction accuracy and can better satisfy the color requirement of practical production.

Keywords

Color prediction; Additive model; Pre-colored fiber blends; Stearns-Noechel model; Transfer function; Linearity.

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