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Sublimation Printing on Polyester-Cotton Denim: A Novel Approach to Customizable Fashion Design

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Abstract:

This study investigates the application of sublimation textile printing technology on denim fabrics constructed with polyester warp yarns and cotton weft yarns. The research examines the effects of fiber composition, fabric structure, and process parameters on print quality and color fastness properties. Results demonstrate that the hybrid fiber composition of polyester-cotton denim creates unique opportunities for sublimation printing with the polyester warp providing excellent dye uptake while the cotton weft remains largely unaffected. Optimal printing conditions were established at 200°C transfer temperature, 2 meters/minute calendar speed, and 3.5 bar pressure, achieving superior color reproduction on the polyester component while maintaining fabric integrity. This work provides fundamental insights for industrial implementation of sublimation printing on mixed-fiber denim substrates. With valid applicability to be used on customizable fashion design

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