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**A Contrastive Study of Adsorption Behaviors on Polyurethane Fiber with  
Diester/Diurethane Tethered and Non-tethered Azo Disperse Dyes<sup>☆</sup>**

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**ABSTRACT**

To look for a way to improve the fastness properties of disperse dyes on PU fibers, six diurethane/diester tethered azo disperse dyes were prepared and applied to the dyeing of polyurethane fibers. Their detailed adsorption behaviors including the dyeing rate, build-up properties, surface-adsorbed state of dyes and colorimetric properties were investigated as well as compared with those of non-tethered azo dyes. The results showed that there were great differences in adsorption properties between the two types of dyes. The excellent build-up performance of the non-tethered dyes was caused by the crystal growth on the surface of polyurethane fibers, and the serious aggregation of dyes on the surface of fibers would alter the color shade, decrease the chroma and produce poor colorfastness properties. When the tethered dyes were applied to polyurethane fibers, owing to their larger molecular sizes, a higher temperature (120 °C) was needed to finish the dyeing process within a conventional time of 30-40 min, and the crystal growth on the surface of polyurethane fibers

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