Behaviour of nitrospirobenzopyran photchromic dye in solvents and on PA fibre

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- Photochromism of dye solutions

- Dyeing process and colorimetric measurement
Photochromism of dye solutions

1′,3′-Dihydro-8-methoxy-1′,3′,3′-trimethyl-6-nitrospiro[2H-1-benzopyran-2,2′-(2H)-indole]
1’,3’-Dihydro-8-methoxy-1’,3’,3’-trimethyl-6-nitrospiro[2H-1-benzopyran-2,2’-(2H)-indole]

Dissolving

Dissolved in EtOAc

Conc.

0.048 \times 10^{-3}, 0.160 \times 10^{-3} \text{ and } 0.228 \times 10^{-3}\text{ mol/l}

Exposition

Solarscreen Test UV chamber STC-01 - exposed at 23\pm 1°C

Phototropism

Fading was done by exposing to specter of visible light (light of 15W)

Measure

Spectral curves were obtained on Nanocolor® 500D spectrophotometer
Solarscreen Test UV chamber STC-01

- equipped by series of five lamps with maximum emission at 320 and 350 nm
<table>
<thead>
<tr>
<th>Dissolving</th>
<th>AC and in EtOAc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aux. chem.</td>
<td>D1 - CHT Dispergator SMS (aromatic sulphonate) and D2 - Meropan NX (polyacrylate with phosphonate)</td>
</tr>
<tr>
<td>Dyed substrate</td>
<td>PA 6 / According to process of exhaustion dyeing</td>
</tr>
<tr>
<td>Apparatus used</td>
<td>Polycolor Mathis*</td>
</tr>
<tr>
<td>Measure.</td>
<td>K/S values and CIE coordinates (L*, a*, b*, C*, h) of the dyed substrates before and after irradiation and fade (exposure to light of 15W) were determined on remission spectrophotometer</td>
</tr>
<tr>
<td>Apparatus used</td>
<td>Spectraflash 600®- PLUS CT</td>
</tr>
</tbody>
</table>
Dyeing process and colorimetric measurement

Exhaustion dyeing

pH 4-5

LR 1:20

\[ C_b = 0.132\% \text{ owof} \]
RESULTS
AND
DISCUSSION
Photochromism of dye solutions

A. \( c_{\text{dye}} = 0,048 \cdot 10^{-3} \) mol/l

B. \( c_{\text{dye}} = 0,160 \cdot 10^{-3} \) mol/l

C. \( c_{\text{dye}} = 0,228 \cdot 10^{-3} \) mol/l

The VIS spectrum of nitrospiropbenzopyran dye in EtOAc
Dyeing process and colorimetric measurement

A. nitrospiropyren dye + D₁ (solvent AC)

D₁- CHT Dispergator SMS (aromatic sulphonate)
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**B. nitrospirobenzopyran dye + D₂ (solvent AC)**

**D2- Meropan NX (polyacrylate with phosphonate)**
CONCLUSION
based on obtained results no obvious photochromic behaviour of 1’,3’-Dihydro-8-methoxy-1’,3’,3’-trimethyl-6-nitrospiro[2H-1-benzopyran-2,2’-(2H)-indole] dye was reported

dye was successfully dissolved in both EtOAc and AC no significant shifts in lmax of the absorption curves was observed

photochromism was favoured by dissolving the dye in AC, which resulted in even dyeings and satisfactory dye exhaustion

regarding quick response time of the dyed substrates to changes caused by altering lmax of the light source (irradiation time 60 s) conventional method of exhaustion dyeing should be considered as successful method of applying photochromic dyes to PA 6