

## Supporting Information

### **Acid dyeing of polyamide-6,6 fabric with carbon black nano particle for camouflage textiles in Vis-NIR Spectrums**

Md. Anowar Hossain

School of Fashion and Textiles, RMIT University, 25 Dawson Street, Brunswick, Melbourne, VIC 3056,

Australia

([engr.anowar@yahoo.com](mailto:engr.anowar@yahoo.com))

**Table 1, reflection (%) of undyed PA-6,6 fabric and reflection (%) of CBP dyed PA-6,6 fabric with Formulation-1, P<sup>H</sup>:0; Formulation-2, P<sup>H</sup>:1; Formulation-3, P<sup>H</sup>:2; Formulation-4, P<sup>H</sup>:3; Formulation-5, P<sup>H</sup>:4; Formulation-6, P<sup>H</sup>:5; Formulation-7, P<sup>H</sup>:6.**

|                         | 400   | 420   | 440   | 460   | 480   | 500   | 520   | 540   | 560   | 580   | 600   | 620   | 640   | 660   | 680   | 700   |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Untreated PA-6,6 fabric | 58.56 | 60.53 | 61.04 | 61.31 | 61.6  | 61.31 | 61.24 | 61.07 | 61.07 | 61.16 | 60.84 | 60.91 | 60.73 | 60.32 | 59.84 | 59.62 |
| Formulation-1           | 13.26 | 13.78 | 14.02 | 14.44 | 14.83 | 15.11 | 15.49 | 15.76 | 16.15 | 16.57 | 16.84 | 17.15 | 17.4  | 17.52 | 17.64 | 17.99 |
| Formulation-2           | 12.04 | 12.56 | 12.96 | 13.14 | 13.6  | 13.86 | 14.28 | 14.6  | 14.94 | 15.32 | 15.64 | 15.94 | 16.14 | 16.44 | 16.5  | 16.76 |
| Formulation-3           | 10.34 | 10.94 | 11.11 | 11.48 | 11.89 | 12.17 | 12.56 | 12.76 | 13.19 | 13.53 | 13.86 | 14.11 | 14.39 | 14.6  | 14.63 | 15    |
| Formulation-4           | 8.21  | 8.52  | 8.8   | 9.03  | 9.37  | 9.61  | 9.92  | 10.11 | 10.49 | 10.76 | 11.04 | 11.27 | 11.51 | 11.59 | 11.72 | 11.96 |
| Formulation-5           | 10.41 | 10.77 | 11.06 | 11.43 | 11.81 | 12.05 | 12.44 | 12.69 | 13.05 | 13.43 | 13.71 | 13.98 | 14.27 | 14.45 | 14.52 | 14.84 |
| Formulation-6           | 11.15 | 11.95 | 12.1  | 12.5  | 12.91 | 13.23 | 13.54 | 13.91 | 14.25 | 14.65 | 14.95 | 15.23 | 15.59 | 15.77 | 15.86 | 16.07 |
| Formulation-7           | 20.18 | 20.76 | 21.07 | 21.35 | 21.73 | 21.93 | 22.24 | 22.42 | 22.67 | 23.03 | 23.13 | 23.35 | 23.81 | 23.81 | 23.83 | 23.9  |

**Table 2, K-M reflection of undyed PA-6,6 fabric and CBNP dyed PA-6,6 fabric with Formulation-1, P<sup>H</sup>:0; Formulation-2, P<sup>H</sup>:1; Formulation-3, P<sup>H</sup>:2; Formulation-4, P<sup>H</sup>:3; Formulation-5, P<sup>H</sup>:4; Formulation-6, P<sup>H</sup>:5; Formulation-7, P<sup>H</sup>:6**

|                         | 400  | 420  | 440  | 460  | 480  | 500  | 520  | 540  | 560  | 580  | 600  | 620  | 640  | 660  | 680  | 700  |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Untreated PA-6,6 fabric | 0.15 | 0.13 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.14 |
| Formulation-1           | 2.84 | 2.7  | 2.64 | 2.54 | 2.44 | 2.38 | 2.3  | 2.25 | 2.18 | 2.1  | 2.05 | 2    | 1.96 | 1.94 | 1.92 | 1.87 |
| Formulation-2           | 3.21 | 3.04 | 2.92 | 2.87 | 2.75 | 2.68 | 2.57 | 2.5  | 2.42 | 2.34 | 2.28 | 2.22 | 2.18 | 2.12 | 2.11 | 2.07 |
| Formulation-3           | 3.89 | 3.62 | 3.56 | 3.41 | 3.27 | 3.17 | 3.04 | 2.98 | 2.86 | 2.76 | 2.68 | 2.61 | 2.55 | 2.5  | 2.49 | 2.41 |
| Formulation-4           | 5.13 | 4.91 | 4.72 | 4.58 | 4.38 | 4.25 | 4.09 | 4    | 3.82 | 3.7  | 3.58 | 3.49 | 3.4  | 3.37 | 3.33 | 3.24 |
| Formulation-5           | 3.85 | 3.7  | 3.57 | 3.43 | 3.29 | 3.21 | 3.08 | 3    | 2.9  | 2.79 | 2.72 | 2.65 | 2.58 | 2.53 | 2.52 | 2.44 |
| Formulation-6           | 3.54 | 3.24 | 3.19 | 3.06 | 2.94 | 2.84 | 2.76 | 2.66 | 2.58 | 2.49 | 2.42 | 2.36 | 2.28 | 2.25 | 2.23 | 2.19 |
| Formulation-7           | 1.58 | 1.51 | 1.48 | 1.45 | 1.41 | 1.39 | 1.36 | 1.34 | 1.32 | 1.29 | 1.28 | 1.26 | 1.22 | 1.22 | 1.22 | 1.21 |

**Table 3, CIE color value of undyed PA-6,6 fabric and CBNP dyed PA-6,6 fabric with Formulation-1, P<sup>H</sup>:0; Formulation-2, P<sup>H</sup>:1; Formulation-3, P<sup>H</sup>:2; Formulation-4, P<sup>H</sup>:3; Formulation-5, P<sup>H</sup>:4; Formulation-6, P<sup>H</sup>:5; Formulation-7, P<sup>H</sup>:6.**

|                         | L*    | a*    | b*    | ΔE    |
|-------------------------|-------|-------|-------|-------|
| Untreated PA-6,6 fabric | 82.43 | -0.32 | -0.01 |       |
| Formulation-1           | 46.98 | 1.06  | 3.98  | 35.71 |
| Formulation-2           | 45.35 | 1.15  | 4.18  | 37.35 |
| Formulation-3           | 42.79 | 1.18  | 4.47  | 39.92 |
| Formulation-4           | 38.43 | 1.21  | 4.33  | 44.24 |
| Formulation-5           | 42.62 | 1.19  | 4.37  | 40.08 |
| Formulation-6           | 44.37 | 1.16  | 4.42  | 38.35 |
| Formulation-7           | 54.63 | 0.55  | 2.41  | 27.92 |

Open Researcher and Contributor ID (ORCID)

Md. Anowar Hossain: <https://orcid.org/0000-0003-2880-6287>