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Supplementary Information for:

A new approach for the preparation of durable and reversible color changing polyester fabrics using thermochromic leuco dye-loaded silica nanocapsules

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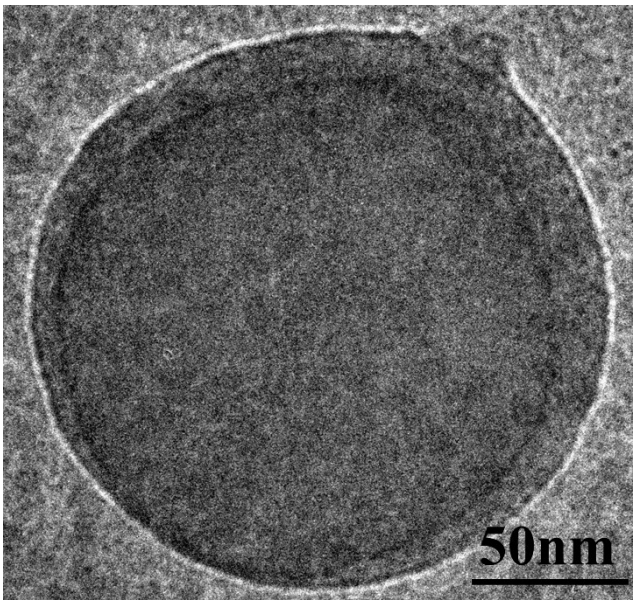

Fig. S1 TEM of TLD@SiO_2

To further investigate the structure of the TLD@SiO_2, a larger size TLD@SiO_2 was prepared using mechanical stirring to emulsify TLD instead of ultraphonic for observing the structure of the TLD@SiO_2 easily. In Fig. S1, a clear capsule structure presented with particle size about 180 nm.

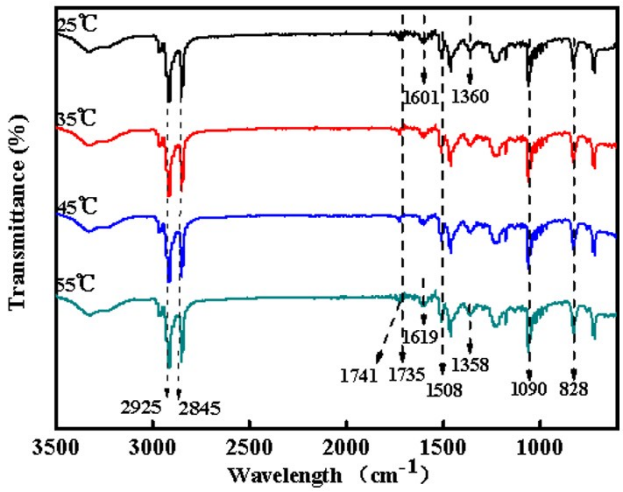

Fig. S2 FT-IR spectra of TLD@SiO_2 in the range of 25°C to 55°C.

The FT-IR spectra of TLD@SiO_2 were recorded in the range of 25°C to 55°C as a control set of thermochromic polyester fabric, as shown in Fig. S2. The change tendency of the FT-IR spectra from 25°C to 55°C was in accordance with that of thermochromic polyester fabric, suggesting that the TLD@SiO_2 on the fabric was not influenced, and still followed the thermochromic principle. The obvious peaks of 1090 cm^{-1} and 828 cm^{-1} were ascribed to the Si-O-Si stretching vibrations.

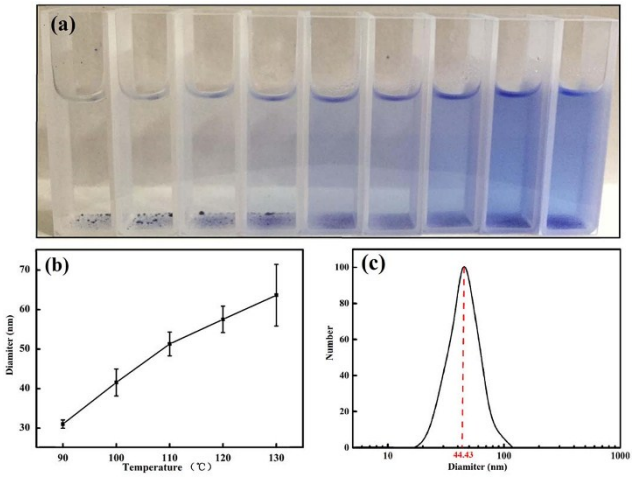

Fig. S3 (a) the dispersities of TLD@SiO_2 in water of various dyeing temperature：from left to right was of 50°C, 60°C, 70°C, 80°C, 90°C, 100°C, 110°C, 120°C and 130°C respectively; (b) the particle size of TLD@SiO_2 in water at various temperatures; (c) the particle size of TLD@SiO_2 in water after treating the polyester fabrics at 130°C for 60 min.

Dye liquors were prepared with 0.12 g TLD@SiO_2, 20 mL deionized water, and pH was adjusted to 6 with HCl (0.1 mol/L). The temperatures of the dye liquors were raised from 30°C to 100°C at a rate of 2°C/min, and then raised to 130°C at a rate of 1°C/min. When the temperature reached to 50°C, 60°C, 70°C, 80°C, 90°C, 100°C, 110°C, 120°C and 130°C, respectively, one of the dye liquors were taken out during the dyeing process, and then they were

photographed at 20°C to compare the concentrations of hydrated TLD@SiO_2 in water.

It can be seen that TLD@SiO_2 was unsoluble in water, and deposited at the bottom of cuvette at the temperature lower than 80°C, but dispersed uniformly in water when the temperature reached or surpassed 90°C (Fig. S3a). The hydrated particle size of TLD@SiO_2 in water also increased with the rise of temperature (Fig. S3b). The hydrated particle size of TLD@SiO_2 was 44 nm after dyeing (Fig. S3c), which was in accordance with the results shown in Fig. 3c. The results indicated that heating can increase the hydration of the TLD@SiO_2 while dyeing, making it produce more hydrophilic hydroxyl group and disperse uniformly in water to dye the polyester fabrics via hydrogen bonds and covalent bonds. All these results indicated that the particle morphology of TLD@SiO_2 can be kept even when it was used to dye at the temperature of 130°C, and TLD@SiO_2 was easy to be hydrated.