

POLYESTER AND ITS BLENDS – CONCLUDING PART

REF: TT/ SEPTEMBER 2020 / WK 5

Reduction clearing of Polyester in Alkali Medium

The conventional process, referred to as reduction clearing, involves treatment of dyed polyester with an aqueous alkaline solution of a reducing agent at temperatures below the boiling point of water. Normally, a solution of sodium dithionite (hydrosulphite), sodium hydroxide, and a surfactant is employed at temperatures in the range 60–80°C for a period of 20–30 min. Because of the hydrophobic character of polyester, and as the process is conducted below the glass transition temperature,

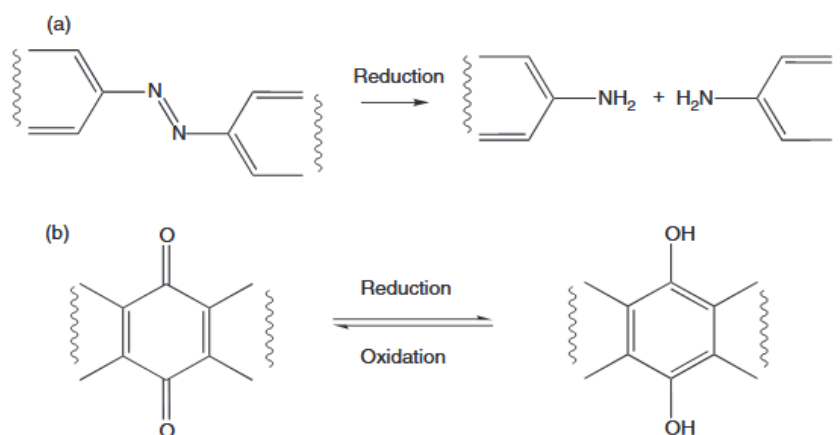


Figure 1 Schematic representations of the processes involved in the reduction of (a) azo and (b) anthraquinone dyes during clearing of polyester

the reducing agent and alkali, both ionic species, cannot penetrate into the interior of the polyester. Thus, dye on the surface is removed, while dye molecules that have diffused into the polymer during dyeing remain unaffected. In addition, after alkaline reduction clearing, neutralization process using acid is necessary.

The most important industrial disperse dyes belong mainly to either the azo or the anthraquinone chemical classes. As the name implies, the clearing process involves chemical degradation of surface dye molecules by reduction. It is commonly proposed that azo groups are reduced irreversibly to form colorless primary aromatic amines and removal of these small molecules is facilitated by the presence of the surfactant in the clearing solution. Dyes based on the anthraquinone chromophore are reduced



to the colorless or weakly colored reduced (leuco) species. These species are soluble in aqueous alkali and are removed from the surface before reoxidation can take place.

Reduction clearing of Polyester in Acidic Medium

Sodium salt of Hydroxymethanesulphonic acids are used as reduction clearing agents, which is done *under acidic medium*. Processing recipe that contributes to process shortening and drainage volume reduction. This method realizes reduction cleaning in the same bath after dyeing by using a reducing agent that exhibits reducing power under acidic conditions, and does not require a neutralization step. It contributes following advantages ,Less BOD, COD in ETP, Higher productivity, Energy and water saving process.

Polyester in Non-apparel area

While polyester is popular in apparel industry, the woven or knitted fabrics from the polyester yarn are used in shirts, pants, jackets, hats, and upholstery. It is also used in several non-apparel products. The polyester fibers are used in the manufacturing of yarns that are used in tyre reinforcements, fabrics for conveyor belts, safety belts and coated fabrics. The polyester fiber is also used as cushioning and insulating material in the pillows, the comforters and upholstery padding.

The polyester fiber and fabric is used in many industries. In automobiles, polyester fibers are used in different forms of textile materials such as circular knitted, warp knitted, woven and nonwoven structures. Fibers are also used as a component in multi-layer composite structures.

In recent time, bio polyesters are being developed to be used in medical industry. Like in surgical sutures, implants, wound healing etc.

Summary

The demand for polyester and its blends is going to increase in apparel, non-apparel and industrial areas in the coming years because of its wide range of performances. Increasing awareness towards the use of textiles in sports, health and safety-related applications is also the reason of increasing demand of these fibers. There have been various new developments in its structure. Functional finishes are done during the manufacturing process or after processing the fabric; which also adds value to its performance and increases its use.

However, these fibers are one of the most polluting substances on the earth. Hence to reduce the impact on environment, various steps are taken. Like producing fabrics using water-efficient methods with low fossil fuel consumption. Recycled polyester is also one such step and the demand is going to enhance in future. It is entirely produced from plastic waste which has already been used. Another innovation in the area of sustainable polyester which is gaining importance is recycled ocean polyester. This helps in solving the problem of ocean and beach plastic, one of the environmental problems of current time. This will help to reduce the flow of plastic waste into the oceans or beaches.

Development in dyeing technology, also contributes towards environment. The technology uses CO₂ as the dyeing medium in a closed-loop process. When heated and pressurized, CO₂ becomes supercritical, a phase between a liquid and a gas. In this state CO₂ has a very high solvent power that means the dye dissolves easily into fibers, developing a brilliant color.



Good to know (Identification of fibers by burning test)

- Polyester melts and burns at the same time. The smoke is black with sweet smell.

- Nylon melts and then burns rapidly. Burnt Nylon smells like plastic.

- Cotton burns with a steady flame and smells like burning leaves.

Rayon burns rapidly with slight ash and smells like burning leaves.

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UNSCRAMBLE THE JUMBLE WORDS

SULAINING

NOCYERVE

CHETLOGYON

LONYN

Last week's Answers: 1) LISTING 2) SUBLIMATION 3) MOIRE 4) SOIL RELEASE

Wishing you a great week ahead!

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