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Surface Chemical Analysis of Sulfur Black 1 Dyed Cotton Fabric Aftertreated with Cationic Fixing Agents

By Quratulain Mohtashim, NED University of Engineering and Technology, and Muriel Rigout, University of Leeds

Abstract

In this study, the relative effect of aftertreatments with two fixing agents (A and B) on the wash fastness of C.I. Sulfur Black 1 dyed cotton fabric was evaluated using ISO 105-C09. The surface chemistry of untreated and aftertreated sulfur dyed cotton fabrics were studied by using X-ray Photoelectron Spectroscopy (XPS). The N(1s) XPS spectrum of fixing agent A aftertreated fabric showed the concentration of uncharged and quaternary nitrogen species, while fixing agent B portrayed only uncharged nitrogen. Fixing agent A improved the wash fastness of the dyed fabric to a greater extent than fixing agent B, owing to the presence of the quaternary nitrogen species. Improvement in the resistance to oxidation of the dye during domestic laundering was observed.

Key Terms

Aftertreatment, Cationic Fixing Agent, Cotton, Sulfur Dye, Wash Fastness, XPS

DOI: 10.14504/ajr.6.4.1

Studies on the Dyeing and Functional Properties of Modified Berberine for a Variety of Fabrics

By Yuxia Liu, Jiliang Cao, Wenxiang Niu, Menglei Liu, and Xin Guo, Henan University of Engineering

Abstract

In the present study, berberine, a natural dye, was modified by a simple chemical conversion with the aim of improving its dyeing properties. The modified berberine was successfully applied in the dyeing and functional finishing of a variety of fabrics. The uptake of the modified berberine by acrylic fabric was more sensitive to the pH of dye bath than that of berberine. The silk, cotton, wool, polyamide, and polyester fabrics dyed with the modified berberine all showed greater

exhaustion than with berberine. In addition, the textile treated with the modified berberine showed better color fastness and much better UV protection ability. This study shows that this novel modified berberine can be suitably applied to prepare multifunctional textiles for many fabrics.

Key Terms
Berberine, Color Fastness, Dyeing

DOI: 10.14504/ajr.6.4.2

Alkyl Alcohols as Defoamers to Remove Foam Generated by Partially Alcoholyzed Polyvinyl Alcohol for Warp Sizing

By Yuanyuan Liu and Zhifeng Zhu, Anhui Polytechnic University

Abstract
Alkyl alcohols were evaluated as defoamers to eliminate the foam produced by partially alcoholyzed polyvinyl alcohol (PAPVA) according to their defoaming ability and actual influence on adhesion to fibers, film properties, and desizability. The alcohols considered included 1-pentanol, 1-hexanol, 1-heptanol, 1-octanol, 1-nonanol, 1-decanol, isooctyl alcohol, and 2-octanol. The impact of alkyl alcohols on defoaming performance was examined and an acceptable dose of 1-octanol was determined. Results showed that defoaming ability, adhesion to fibers, and film behaviors depended on the alkyl group and dose of alcohols used. Straight alcohols were superior to the branched ones tested in defoaming ability and properties. Generally, 1-octanol was the best defoamer of the selected alcohols. Excessive increases in alkyl length and dose induced poor defoaming and damaged the adhesion and film behaviors.

Key Terms
Alcohol, Defoamer, Partially Alcoholyzed Polyvinyl Alcohol, Warp Sizing

DOI: 10.14504/ajr.6.4.3

Detecting Silver in Silver-Enabled Textiles by a Newly-Developed Portable Device

By Tünde Dudás, Teodóra Nagyné Kovács, Imre Miklós Szilágyi, and Ferenc Mester, University of Szeged

Abstract
In the production of silver-enabled textiles, the amount of silver in the produced textile is always important. The goal of the present study is to develop a simple device that can directly detect silver instead of using destructive tests and calculations. The instrument developed by our group is simple, easy to use, and portable. It gives a voltage response corresponding to the silver content. To show its capabilities, a correlation is presented between the measured voltage and the relative amount of metal (i.e., silver) on silver-enabled textiles after several washing and electrolysis steps. The results of scanning electron microscopy-energy dispersive X-ray analysis (SEM-EDX) measurements are also presented as a reference for the silver determinations.

Key Terms
Coated Fiber, Metal Detection, Nanoparticle, Resistance, SEM-EDX, Silver

DOI: 10.14504/ajr.6.4.4