

Charles A. Steele

823 S. Harvey Ave.
Oak Park, IL 60304

Phone: 708-383-8320
Fax: 708-383-9382
Email: chssteele@aol.com
www.anevalinc.com

Section 1: Summary

I am currently employed both as the Laboratory Manager and Quality Manager for Keystone Aniline Corporation and as an Analytical Consultant through Aneval Inc. My professional and scientific experience, through these corporations, expands into several industries: ranging from cosmetic chemistry and ink formulating to forensic science and security tagging.

At Keystone Aniline Corporation I am primarily responsible for designing and implementation of laboratory practices and procedures for several laboratories as well as product research and development for a variety of industries including: Cosmetics, Plastics, Paper, Ink, Leather, Textiles and Detergents. In addition, I am the primary architect of the corporate wide ISO system.

Through Aneval Inc. I provide product and process development consulting as well as analytical testing services. A primary service of the consultancy has been to design and implement the necessary methods to test the validity of patent claims both prior to patent filing and in defense of existing patents. The consultancy also provides a vehicle for independent research.

I have developed a variety of new products and necessary laboratory support. Notable accomplishments of these efforts include Keystone's Hair Dye and Security Tagging product lines as well as design of the DataTrax™ Encoded Microparticle and the development of two finger printing systems.

My recent research has resulted in four publications since 2002 in the areas of: Fingerprinting, Lightfastness and Security Tagging. Current research projects include gentler hair dyeing systems, new methods for the detection of blood residue and cataloging fluorescent indicators.

Section 2: Primary Education

University of Illinois at Chicago <i>Criminalistics</i>	9/95 to 6/97
University of Illinois at Chicago B.S. <i>Physics</i> , (Minor in Chemistry)	9/91 to 12/94
Triton College	Spring 1990
University of Chicago	Summer 1988
Triton College	Fall, 1986
Illinois Institute of Technology	8/84 to 12/85
Fenwick High School	9/80 to 6/84

Section 3: Additional Education, Seminars & Workshops

Society of Cosmetic Chemists <i>Hair Color</i>	June, 2002
Packaging Manufacturers Institute <i>Packaging Line Security</i>	February, 2002
Society of Cosmetic Chemists <i>Ethnic Hair and Basic Hair Care</i>	March 2001
McCrone Research Institute <i>Hair Microscopy</i>	May, 1993
McCrone Research Institute <i>Microscopy of Man Made Fibers</i>	July, 1992
Newberry Library <i>Writing Fiction</i>	Fall 1988

Section 4: Employment History

Aneval Inc.

President

1996 to Current

Through Aneval Inc. I have worked as a private consultant doing analytical testing, patent claims validation and product and process development. I have worked with companies like Tracking Technologies to develop security tagging products capable of meeting evidentiary requirements. I have also been employed as an expert witness in cases of product liability claims and patent infringement.

In addition to providing commercial services, Aneval Inc. is also actively engaged in research and internal product development. One previous research project produced a method for enhancing fingerprints on plastic tape (ref. Journal of Forensic Science, November 2003, Vol. 48, No. 6). Current research areas include cataloging of fluorescent indicators and evaluating their use for visualization against brightly colored and fluorescent backgrounds.

Keystone Aniline Corporation

Laboratory Administrator/Product Chemist

1995 to Current

At Keystone, my administrative responsibilities include: supervision of personnel, monitoring of workflow for three laboratories, authoring operating procedures and upgrading laboratory capabilities. In addition to these, I also provide technical service to a variety of companies and government agencies in the United States and abroad. Technical responsibilities include: product line development, setting quality control practices and approximately 130 customer projects per year.

Among my achievements at Keystone have been the development of a new automotive leak tracer (patent applied for) and the development of new product lines including: Hair Dyes, Security Tagging, Wood Stains and Forensics. I am currently developing a line of dyes and specialty chemical for detergents.

Princeton Review

Instructor

1995 to 1996

Instructor for ACT/SAT review classes

Section 5: Significant Publications & Presentations

Enhancing Contrast of Fingerprints on Plastic Tape

Journal of Forensic Science, November 2003, Vol. 48, No. 6

Abstract:

Many of the currently available fingerprinting methods have limited ability to visualize fingerprints on plastic tape without expensive equipment or significant handling of the sample. This is especially true for visualizing fingerprints on black electrical tape. This study sought a hands-off method to produce easy visualization of fingerprints on different types of plastic tape, including black electrical tape, without the need for expensive equipment. The methods selected were to sublime disperse dyes into the tape, both with and without the fuming of cyanoacrylate, everywhere except for where the fingerprint was applied. The resulting color contrasts provided enough differentiation to visualize fingerprints on plastic tape under ambient light. Sequential fuming with cyanoacrylate followed by disperse dyes provided the best visualizations on all tapes, and cyanoacrylate followed by disperse yellow 211 clearly visualized fingerprints on black electrical tape.

Locational Variations as an Obstacle to Single Point Reference Light Fade Studies

AATCC Review April 2003

Abstract:

This study evaluates the validity of light-fastness predictions based on standardized reference models that rely on a single testing environment. Light-fastness of identical sample sets were evaluated for the same duration of exposure to sunlight in five different locations around the North American Continent.

This study shows that identical samples in different locations fade to differing degrees even when exposed to a consistent duration of irradiance. Furthermore the relative fade rate was inconsistent from one sample type to another. Therefore, an accurate color fastness prediction for a specific colorant must be determined by testing that colorant, under the actual conditions of use, in the intended environment of use.

Relative Light-Fastness of the Colors Formed From Oxidation Dye Intermediates
Presented 2002 SCC Technical Showcase, New York, USA

Abstract:

As part of an ongoing study, combinations of oxidation dye intermediates were categorized according to the light-fastness of the color they produced on human hair.

Five sets of virgin blond human hair tresses were dyed with one of six commonly employed primary intermediates in combination with either a secondary or primary intermediate, on a 1:1 M.W. basis. One set of these dyed tresses was retained as a control, with the remaining sets being treated as required to emulate various environmental conditions/states and then subjected to UV light (employing an Atlas SunChex) in order to accelerate their potential for light instability. The environmental states evaluated included the following: dry hair; wet hair; hair wet with perspiration; hair wet with "swimming pool" water.

After UV exposure, each tress was evaluated both for the direction of the color shift and the decrease in overall color intensity according to the AATCC gray scale. Based on these data, the dye intermediate combinations were grouped according to their potential for light instability.

An Evaluation of Security Marking And Tagging Systems For Polymers and Polymer Products

Presented 2002 SPE RETEC, Toronto, Canada

Abstract:

Product Identity Fraud (PIF) is a general term encompassing **Alteration, Counterfeiting** and **Diversion** of raw materials and finished goods. PIF has always existed but in recent years improvements in production technology have caused the magnitude of these crimes to exceed two hundred billion dollars annually. In addition, these crimes have an incalculable impact on long-term brand equity and pose a genuine health and safety risk to people around the world.

One of the ways corporations are trying to secure their products against PIF is to include **Security Marking** and **Security Tagging** systems into manufactured goods and raw materials. Often these security systems are incorporated directly into the polymers that comprise the finished product. However, not all approaches are equally beneficial. Inappropriate systems can be expensive and still not provide the desired level of security. Poorly designed or implemented systems can actually increase vulnerability to PIF.

This paper therefore explains differences between marking and tagging systems, establishes the requirements for Durability, Readability and Uniqueness for valid systems and evaluates several systems for their use in securing polymers and polymer systems.

Testing of Hair Dye Products:

Presented 2000 James Robinson Agents Conference, Brampton, UK

Abstract:

The testing of hair dye products is intertwined with the formulating process. Before formulating can even be initiated, preliminary testing must be performed to insure that the materials used are of consistent and sufficient quality. Then during to the formulating process itself, a variety of testing is done to determine the formulation's compliance with predetermined goals. Finally after a formulation is arrived at it has to be validated and tested for efficacy and stability.

Keystone Quality Hair Dyes Technical Guide and Formulary

© 1999, 2003 Keystone Aniline Corporation

Summary:

Written as both an educational manual and a laboratory bench reference, the Keystone Quality Hair Dyes Technical Guide and Formulary presents an overview of the chemistry of hair dye products, technical information on the colorants used, and formulations for dozens of typical and novel products.

Section 6: Technical Bulletins & White Papers

Since 2000, I have headed up the production of Keystone Aniline Corporation's technical data; serving as editor for more than 245 publications. In addition I have authored or coauthored the publications listed below for industrial applications ranging from decorative dyeing to security tagging. They are available as Technical Bulletins from Keystone Aniline Corporation and can be requested via the company website at www.dyes.com.

Acid Dyes For Feathers

© 2000 Keystone Aniline Corporation
Products and dyeing methodologies

Color Control in Paper Making

© 2000 Keystone Aniline Corporation
Overview of color control process

Color Formed from Oxidation Dye Intermediates

© 2000 Keystone Aniline Corporation
Listing of reaction products from combinations of hair dye intermediates

Dyes for Antifreeze

© 2000 Keystone Aniline Corporation
Lists of dyes suitable for antifreeze formulations

Dyes for Xerographic Photo Copy Toners

© 2000 Keystone Aniline Corporation

Listing of products and physical properties

Keyacid Rhodamine WT Liquid

© 2000 Keystone Aniline Corporation

Water tracing method

Keyphos Phosphorescent Colorants

© 2000 Keystone Aniline Corporation

Catalogue of physical properties

Ochre for Paper

© 2000 Keystone Aniline Corporation

Technical data

Optical Brighteners for Textiles

© 2000 Keystone Aniline Corporation

Methods for overcoming yellowing of textiles

Strength vs. Purity

© 2000 Keystone Aniline Corporation

Descriptive essay on terminology

Tags, Taggants and Markers

© 2000 Keystone Aniline Corporation

Overview of types and requirements of tagging and marking systems

Certified Colorants D&C and FD&C

© 2001 Keystone Aniline Corporation

Technical and applications data of certified colorants

Color Enhancing Hair Care Products

© 2001 Keystone Aniline Corporation

Formulation methods for cationic hair dyes

DataTrax. Application Report

© 2001 Keystone Aniline Corporation

Results of stability testing of particulate taggants in a variety of substrates

DataTrax. Encoded Microparticles

© 2001 Keystone Aniline Corporation

Product technical data

Dyeing Methods for Acid Dyes

© 2001 Keystone Aniline Corporation

Dyeing methods for textiles, fibers and resinous materials

Dyes for Aqueous Inks & Coatings

© 2001 Keystone Aniline Corporation
Listing of acid dyes for water based applications

Dyes for Carpet “Touch-Up”

© 2001 Keystone Aniline Corporation
Dyes and application methodology

Dyes for Heat Transfer Printing

© 2001 Keystone Aniline Corporation
Overview of heat transfer printing process

Dyes for the Seed Treatment Industry

© 2001 Keystone Aniline Corporation
Listing of available and allowable products

Dyes for Water Tracing

© 2001 Keystone Aniline Corporation
Description of methodologies and available dyes

Flaw and Strain Detection

© 2001 Keystone Aniline Corporation
Use of solvent yellow 43 for non-destructive testing

pH Indicators for Water-Based Applications

© 2001 Keystone Aniline Corporation
Listing of dyes useable as non-standard pH indicators

pH Stable Dyes for Water-Based Applications

© 2001 Keystone Aniline Corporation
Catalogue of chemically stable dyes

Keystone Nerosol Dyes

© 2002 Keystone Aniline Corporation
Technical data and applications for wood stains and coatings

Oil Dyes for Candles

© 2002 Keystone Aniline Corporation
Product list and formulation methods

Keystone Fluorescent Dyes

© 2003 Keystone Aniline Corporation
Catalogue of dyes and physical properties

Section 7: Professional Associations

The Society of Cosmetic Chemists (SCC)

The Society of Plastics Engineers (SPE)

International Association for Identification (IAI)

American Association of Textile Chemists and Colorists (AATCC)