



Erasmus+



NETCHEM

NETCHEM Remote Access Laboratory Guide

Coloring cotton fabric with reactive colors and determining the degree of coloration (CIELAB coordinate) with a reflex colorimetry



In this exercise, you will:

- Learn how to determine the degree of coloration
- Get familiar with CIELAB
- Gain experience in reflex colorimeter usage

Background

Color science is interdisciplinary in its character, since the complex formation of color can be explained by the inclusion of physics, chemistry, physiology and psychology as fundamental scientific fields.

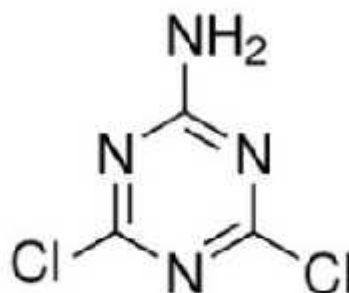
Color is the visible observation of a certain part of the visible field which is distinguished from one stationary eye from the simultaneously observed area of the same surface structure. Color is a special kind of psychophysical feeling caused in the eye under the influence of visible light. This incident light or the so-called colored stimulus causes an irritation of high sensitivity receivers in the eye, producing a nerve impulse. He is later transported to a brain that recognizes him as a given color.

Reactive colors represent a large group of colors. They were first used for painting cellulosic fibers, in order to later find application in staining natural silk, wool and polyamide fibers. Reactive groups are characterized by the fact that in each molecule there are groups that can create a covalent bond between an atom of carbon , an ion or a molecule of color and an oxygen atom, nitrogen or sulfur with hydroxy, amino or a fiber molecule. These colors contain characteristic reactive groups, and on this basis they are divided into monohlortiazine, dichlorothiazine or vinyl sulfuric color.

The first colors, under the commercial name "Procyon", can be bonded to cellulose and permanently fixed to the fiber thanks to the reactive chlorine atom:



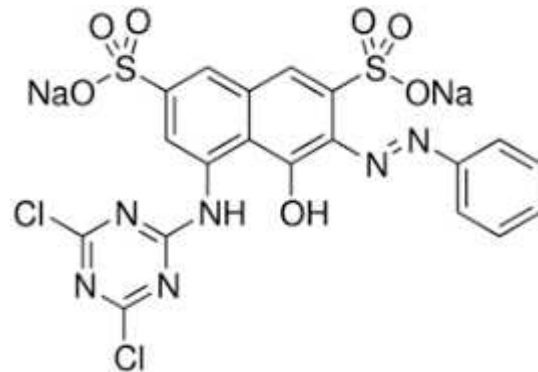
Procyon colors are by chemical composition the dichlorotriazine derivatives of the general formula:





Erasmus+

The -NH₂ group can be replaced with residues of azo, anthro-chinonic, phthalocyanine or other colors as can be seen on the example of reactive monoazo-color PROCION red:



With this exercise we should be dyeing the cotton fabrics weighing accurately determined masses. Coloring is carried out according to a certain temperature regime with the addition of certain chemicals. Objective evaluation of the achieved degree of coloring is done by measuring the CIELAB coordinate with a reflection colorometer.

Material

For this lab exercise, you will need the following material :

- Cotton fabric (1.000 g)
- Reactive color CIBACRON BRILLIANT ROT B-E (2.5% related to weight of cotton fabric),
- Sodium chloride (NaCl) 40 g/L (10% stock solution)
- Sodium carbonate (Na_2CO_3) 15 g/L (10% stock solution)
- wetting agent (surface active agent (SAA) 2 g/L



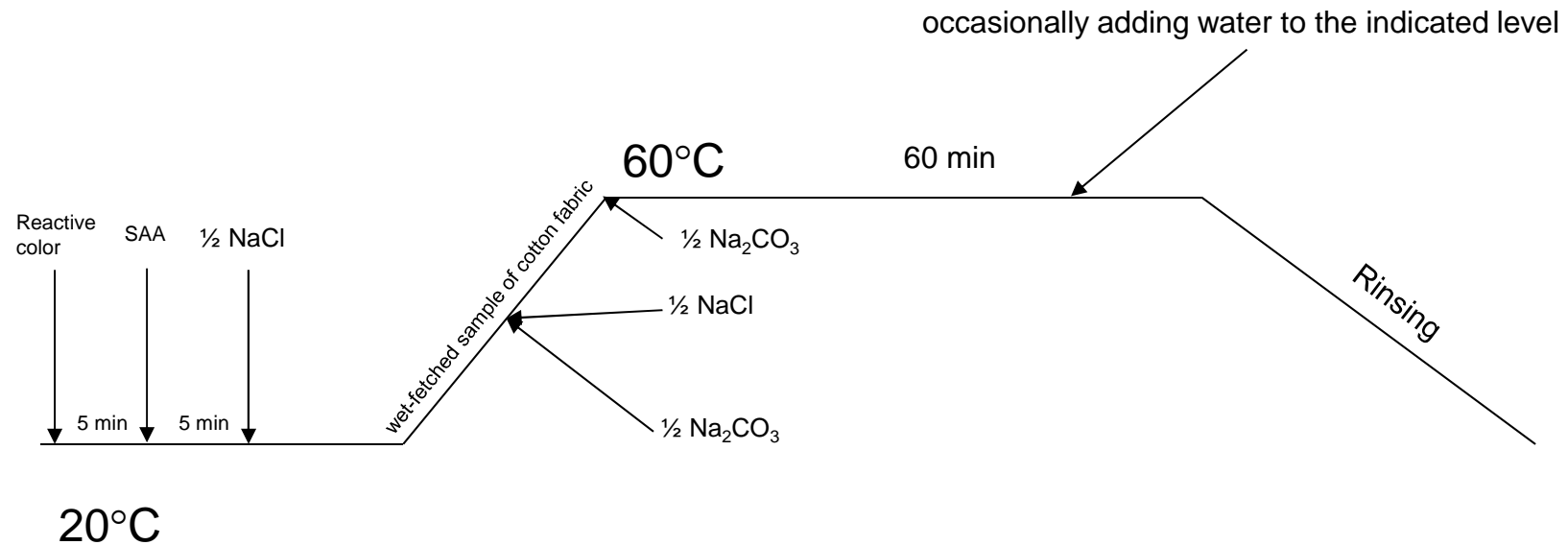
Procedure:

- Heat the required volume of distilled water at 20 degrees and then add color.
- After 5 minutes, add half of NaCl, and after 5 minutes, add a wet-fetched sample of cotton fabric.
- After 5 minutes, add half of Na_2CO_3 and the other half NaCl.
- Then raise the temperature to 60 degrees and add the second half of Na_2CO_3 .
- Perform staining for 60 minutes with occasionally adding water to the indicated level.
- Then rinse the sample with water, dip it and dry.
- Coloring is done in a 1:50 bath (1 refers to the mass of cooked cotton material and 50 to the total closing bath)





Temperature during the process





Erasmus+

Conclusion

The cotton fabric is successfully painted with reactive color, and the obtained coloring is the intensity that is in accordance with the used color concentration. For a clear determination of the achieved dye, it is necessary to measure the reflex color and present it to the CIELAB coordinates.



DESCRIPTION OF REMOTE ACCESS	
1. NETCHEM COMMUNICATION SIDES	
(NOTE: NETCHEM Communication is defined as event that involves all kinds of internet interactions (in real time and not in real time) between participants via devices (PCs, laptops, tablets and mobile phones))	
host side (NOTE: Host side of NETCHEM Communication is defined as PC who invites other users to join the session)	participant's PC in classroom
guest side (NOTE: Guest side of NETCHEM Communication is defined as PC who joins the invitation to session)	participant's PC in laboratory
2. COMMUNICATION SOFTWARE	
Team Viewer	Meeting: No Remote control: No Meeting and Remote control simultaneously: No
Skype	Call 1:1: Yes Conference Call: No
3. COMMUNICATION HARDWARE	
on host side	1 PC for each participant, headset, microphone, camera
on guest side	1 PC for participant, headset, microphone, camera (or tablet/mobile phone)
4. INFORMATION EXCHANGE TYPE	
Educational (one side is dominantly receptive)	Yes Place of Educator participant: guest side Number of educator(s): 1 Place of student participant: host side Number of student participant(s): up to 20
Consultative (two sides are equal in giving/receiving information)	No Number of host side participant(s): / Number of guest side participant(s): /





Erasmus+



Remote Access Connection Instructions

What makes these labs different and unique from other classroom experiments is that we have incorporated a section in each activity to remotely characterize your samples from your classroom.

Request a remote lab session specifying information such as: the day, the time, and the instrument you are interested in using by visiting our web site:

<http://netchem.ac.rs/remote-access>

You will see the list of partners with the instruments provided to choose from.

You will be contacted by a Remote Access staff member to set up a test run to ensure you are set up properly and have the required infrastructure.

Send samples or verify the in-house sample you would like us to prepare and load for characterization.

Send your samples to the Remote Access center that you chose on your request.

There are two communications software packages, that will allow us to communicate instructions and answer questions during the session.

- TeamViewer: You can obtain a free download at:

<https://www.teamviewer.com/en/index.aspx>

- Skype



Remote Access Connection Instructions

You will need:

- a) Computer with administrator access to install plug-ins and software
- b) An internet connection
- c) Speakers
- d) Microphone
- e) Projector connected to the same computer
- f) Web browser (Firefox preferred)

During the test run you can refer to this guide to perform the following steps, but it's very important that you only proceed with these steps during your scheduled times. You may interfere with other remote sessions and potentially damage equipment if you log in at other times.

- a) Open and logon to your Zoom/Team-viewer account. You will be given the access code to enter at the time of your test and then again during the remote session.
 - If you are using the Zoom software, Remote Access staff will give you the access code.
 - If you are using the Team-viewer software, Remote Access staff will give you the ID & password.
- b) You should soon see the Remote Access desktop and at this point you can interact with the icons on the screen as if it were your desktop.
- c) Switch to full screen mode by selecting the maximize screen option in the top right corner of the screen.
- d) Upon completion of the session, move your mouse to the top right corner of the screen, and click on the X to disconnect the remote session. It will ask if you want to end the remote session. Click Yes.



Erasmus+



Author, Editor and Referee References

This remote access laboratory was created thanks to work done primarily at University of Niš.

Contributors to this material were: ___Milena Miljkovi ___

Refereeing of this material was done by: _____

Editing into NETCHEM Format and onto NETCHEM platform was completed by: _____



References and Supplemental Material

The NETCHEM platform was established at the University of Nis in 2016-2019 through the Erasmus Programme.

Please contact a NETCHEM representatives at your institution or visit our website for an expanded contact list.

The work included had been led by the NETCHEM staff at your institution.