Uniwersytet Wrocławski

Repozytorium

Plik pochodzi z repozytorium Wydziału Chemii Uniwersytetu Wrocławskiego

Application of chemometric methods for the determination of fading and age determination of blue ballpoint inks.

Autorzy

Barbara Łydżba-Kopczyńska

Tomasz Czaja

Rafał Cieśla

Grzegorz Rusek

Rok wydania

2021

Czasopismo

Journal of Raman Spectroscopy

Numer woluminu

52

Strony

159-169

DOI

10.1002/jrs.6037

Kolekcja

Naukowa

Język

Angielski

Typ publikacji

Artykuł

Streszczenie

This study presents preliminary results for applicability of micro-Raman and VIS–NIR reflectance spectroscopy in age determination of blue ballpoints inks containing phthalocyanine and crystal violet. Based on chemometric methods, 74 different random blue pens were classified to various types of inks. Then handwritten samples stored in different light conditions were subjected to the analysis. The first set of samples was stored for 7 years at room temperature in an envelope without direct exposure to the light, whereas the second set of samples was aged by exposing them to natural light cycle for 85 days. The *L*, *a*, *b* values were determined on the basis of recorded Raman and VIS–NIR spectra and then used for chemometric calculation. Based on those values, partial least squares models were built, allowing to obtain correlations between ΔE and Raman and reflectance spectra. Relative standard errors of prediction RSEP(%) for obtained models were calculated in the range 1.97–5.13 and 1.20–2.27 for Raman and VIS–NIR spectra, respectively. The proposed nondestructive method allows to estimate the age of daylight exposed samples.

Słowa kluczowe

age determination, chemometrics, micro-Raman spectroscopy, questioned documents, VIS–NIR spectroscopy

Adres publiczny

http://dx.doi.org/10.1002/jrs.6037

Strona internetowa wydawcy

onlinelibrary.wiley.com

Plik został wygenerowany dnia 2026-11-08 22:43:35

Adres w repozytorium https://old.chem.uni.wroc.pl/pl/repozytorium/jEMFRJ2.