

Applications - Forensic, doping and toxicology

N. prog: P 170

Title: COMPARISON OF THE KINETICS OF DYES DEGRADATION OF HANDWRITTEN STROKES SUBJECTED TO DIFFERENT TYPES OF ARTIFICIAL AGING AND STUDIED USING CHROMATOGRAPHY MASS-SPECTROMETRY AND STATISTICAL DATA PROCESSING

Authors: D. Baygildieva, A. Sherstneva, I. Plyushchenko, I. Ananieva, O. Shpigun, I. Rodin

Affiliation: Chemistry Department, Lomonosov Moscow State University, Moscow, Russia

Abstract body

In the judicial practice, disputes related to the counterfeit documents often arise and, therefore, it is necessary to establish the fact of installation – making additional notes, the sequence of plotting fragments (signatures, numerical designation, stamp print), and intentional impact on document by different improvised means. Determination of absolute age of document manufacturing is one of the basic problems of forensic technical document examination. This problem is usually arisen in cases when it is necessary to establish the time of document manufacturing, for example, in the purposes of determining the time of crime commission, establishing the fact of a document falsification from the point of view of impossibility of its execution in accordance with the date indicated in the document. The solution of such problems is reduced to the application of methods for the study of document details and materials using various physical and chemical methods. At the same time, the physicochemical properties of writing tools (the properties of a ballpoint pen pastes, inks, markers or inks for inkjet prints).

This paper describes the use of the method of statistical processing of raw data obtained by liquid chromatography mass-spectrometry. Handwritten stroke samples plotted by blue ballpoint pen inks were subjected to artificial aging under the influence of UV-, IR-radiation and elevated temperatures. After that, extracts of stroke samples stored under

natural aging conditions and stroke samples accelerated aged were analyzed on a liquid chromatography in combination with mass spectrometric detection with electrospray ionization. Using a mathematical model of statistical data analysis, it was a possible to isolate stroke samples of natural aging into a separate group. This approach allows to define falsified document samples.

This work was supported by Russian Foundation for Basic Research (Grant. No 17-03-00369) for Lomonosov Moscow State University.

Attach

