

## Application of Microspectrometry in Visible Range to Differentiation of Car Solid Paints for Forensic Purposes

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Examination of paint chips found on the car accident place or on victim clothing requires application of optical and spectrometric methods which are non destructive for the sample and provide information about its colour, morphology and chemical composition. Colour is one of the most important characteristics of paint. The determination and comparison of colours are the first step to be taken in forensic investigation. Mikrospectrometers allow an objective measurement of the colour opposed to the subjective results of visual colour comparison. They measure the light energy which is transmitted, absorbed or reflected by a sample at each wavelength of the visible and UV spectrum. As result spectra are obtained and parameters of colour (according to the Commission Internationale de l'Eclairage [CIE] system) are calculated which makes colour comparison of paint samples, much easier [1, 2].

The aim of the paper was to estimate the usefulness of spectral information obtained by Vis microspectrometry in differentiation of small paint coat fragments for criminalistic purposes. The repeatability of the method was also evaluated.

Fragments of red, blue and green solid car paints were chosen for examination. J&M microspectrometer combined to a C. Zeiss Axioplan microscope was used to undertake the measurements in reflectance mode, with Epiplan 50x objective. The spectral range was between 380-780 nm. Samples were measured both, directly on cross section of the paint chip and via the top layer using light beam coming perpendicular to the top surface of the sample. A Tidas program from J&M was used for colour parameters calculation, i.e. tristimulus values, chromacity coordinates and CIELAB units.

It was found that microspectrometry in visible range enabled to distinguish between paint samples of the similar colour and shade but originating from different cars. The results obtained for paint chips measured in cross-section were reproducible. The variation in colour of paint samples measured via top layer was bigger. This seems to be caused by inhomogeneity of paint, defects in top coat originating from weathering process or scratches.

[1] G.J. Chamberlin, D.G. Chamberlin, *Colour, its measurement, computation and application*, Heyden&son Ltd, 1980.

[2] D.R. Cousins, C.R. Platoni, L.W. Russel, *Forens. Sci. Int.* 24 (1984) 183-196.