

## SPECTRAL FLUORESCENCE SIGNATURES (SFS)

The principle of SFS is based on the measuring of the fluorescence intensity of a sample at different excitation and emission wavelengths. The intensity of light induced fluorescence as a function of excitation and emission wavelengths constitutes a 3-dimensional fluorescence matrix of the sample. Such matrix, named as the Spectral Fluorescence Signature (SFS), can also be presented in a 2-dimensional colored pattern, where the colors represent the intensity of fluorescence.

Since various chemical substances have different characteristic excitation and emission spectra of fluorescence, they typically produce different spectral patterns in SFS, which are used for substance identification. The intensity of fluorescence serves as a measure of substance quantity\*.

To provide the analysis of a sample with unknowns, the SFS library of thought after compounds is compiled and calibrated. Then the pattern recognition technique is used to identify the similarity of the spectral patterns in measured SFS and corresponding spectral data in the SFS library.

In such analysis the SFS is de-convoluted into separate spectral patterns manifesting the substances in a mixture instead of physical separation of the substances like in chromatography analysis. This is why the SFS analysis technique can be referred as spectral or mathematical chromatography.

\* S.Babichenko, L.Poryvkina, et al.

