Ink Analysis/Ink Dating

The examination of ink writing in a forensic context usually relates to either or both of the following questions:

Do these writings have a common source?

When were these writings prepared?

The type of documents that may be presented in a legal matter range from the simple, like a will, check, contract or letter, to the more complex, like an inventor notebook, diary or log book. In all matters it is usually possible to ascertain the number and types of ink formulations present. This fact can be useful when an association can be determined between various entries in a diary for instance. The fact that all the entries which refer to purported harassing events are prepared in a single ink formulation, yet other entries purported to be from the same time frame are prepared with multiple inks. This examination would involve the use of Thin Layer Chromatography (TLC) and Gas Chromatography/Mass Spectrometry (GC/MS) to characterize the various ink entries.

In addition to the association between various entries, it is possible to address the second question – When were these writings prepared? As the materials used to prepare the questioned document, for example a trust, age, they change. The handwritten notations, such as signatures, are changed by the evaporation of semi-volatile components. This process can take up to 2 years and thus the level of change provides a measure of the age of the writing. This examination would involve the use of Gas Chromatography/Mass Spectrometry (GC/MS) and/or Reflectance Spectrophotometry (densitometry). Additionally, the toner based printing from a laser printer or copy machine also goes through changes in the amount of oxygen present in the toner. As such, it can be determined if the toner is greater or lesser than 2 years of age. This examination is performed via X-ray Photoelectron Spectroscopy (XPS). It is also possible to characterize toner based printing and associate multiple pages or illustrate a page substitution through the use of Fourier Transform Infrared Spectroscopy. (FTIR)

Documents of all ages can be examined and can provide useful information regarding the date or time period of preparation. Documents of historical value or that would be characterized as memorabilia often present a different challenge due to the materials used to prepare them. Through the use of Scanning Electron Microscopy (SEM) equipped with an X-ray detector and/or X-ray Photoelectron Spectroscopy (XPS) we can detect inconsistencies within a document relating to the purported date or time period of preparation.