



Advanced NMR

● For Forensic Laboratories

Nuclear Magnetic Resonance (NMR) spectroscopy is a hugely powerful technique that has been applied in diverse scientific fields, ranging from chemistry to agriculture, medicine to geology. In the last decade, the technique has also emerged as a vital tool in forensic analysis that is helping customs and border authorities deal with diverse threats like narcotics, doping agents, chemical warfare agents and explosives.

Mass spectrometry is the standard method for identifying drugs in forensic toxicology. However, this approach is most useful for known drug substances or, at the very least, an idea of the type of substance a sample is likely to contain. Additionally, compound specific reference standards are required for accurate quantification.

- Shorten your time-to-result
- Directly benefit from expert knowledge and support
- Built-up your own expertise by using training synergies
- Generate coherent data through harmonized methods
- Free-up measurement time at high investment instruments

A major issue for police and border agencies is the growing prevalence of new psychoactive substances, which are emerging at a rate of around 100 per year. These drugs, sometimes referred to as "legal highs", often have an unknown chemical structure, meaning they are unsuited to detection with mass spectrometry.

As in drug detection, enforcement agencies increasingly need to test when they don't know what they're testing for.

The NMR Advantage

NMR is the ideal technology to overcome these challenges in forensic analysis. As a non-targeted method, it can be used to detect and quantify unknown compounds, even in complex samples, without the need for compound-specific reference substances.

NMR is also highly specific, providing a “fingerprint” of the tested sample and highly reproducible data that can be relied upon by enforcement agencies and the courts. It is able to distinguish between isomers – ideal for circumstances where substances may have subtle differences in their 3D chemical structure.

At Bruker, we are leading the way in the growing field of forensic NMR. We currently work with police, customs and border control laboratories in more than 40 countries. Not only do we deliver the technology to conduct complex NMR experiments, we have also made NMR more accessible than ever with our benchtop NMR spectrometer, the Fourier CrimeLab, and the option of easy-to-use software (GoScan) for less-experienced practitioners.

NMR at its Most Accessible – The Fourier CrimeLab

The Fourier CrimeLab is an 80 MHz compact benchtop NMR spectrometer that challenges the notion that NMR is complicated and time-consuming. Ideal for a satellite laboratory, it is easily installed in any lab without the need for additional infrastructure. And with the option of the new Bruker GoScan interface, it makes NMR straightforward for even the newest NMR user.



NMR at its Most Advanced – AVANCE NEO

The AVANCE NEO is the next generation in NMR, and the ideal platform for the centralized forensic science center. The AVANCE NEO features our unique transceiver technology, which allows each NMR channel to act like an independent spectrometer, facilitating multiple simultaneous experiments.

By separating the acquisition server from the operating software, the AVANCE NEO can operate independently from the computer, or even be controlled from the cloud.



NMR connected

With both the Fourier CrimeLab and AVANCE NEO calibrated for networking, Bruker offers the unique opportunity to connect a network of nationally or internationally linked laboratories. Automated basic analysis can be carried out at a local-level satellite laboratory networked to a centralized Forensic Science Center, which conducts high-level analysis, resulting in seamless data sharing, faster results and more efficient use of resources.

Unique to Bruker, the benchtop Fourier CrimeLab and the AVANCE NEO feature the same industry-standard software – TopSpin – bridging the gap between traditional NMR and benchtop applications with one familiar interface. GoScan, the customizable push-button interface, can be enabled on the benchtop system for less experienced NMR users, offering unrivaled flexibility and access to NMR.