Josef Dadok National NMR Centre

What we do

Josef Dadok National NMR Centre offers analyses using NMR spectroscopy.

We are equipped with spectrometers in the range of proton frequencies from 500 MHz to 950 MHz. Spectra of liquid as well as solid-state samples can be measured. Our instrumentation is ideally suited to the studies of structure, dynamics and interactions of biomolecules, i.e. proteins, nucleic acids and carbohydrates. However, the spectrometers are flexible enough to cover most research needs in organic and inorganic chemistry, material science, biochemistry, biology and biophysics. Qualified users can access the instrumentation independently and perform their own measurements.

Services and Methodologies Provided

Quality control

NMR is a suitable method for detecting impurities such as solvent residues and it is widely used in the pharmaceutical, medical, and food industries for quality control.

Our laboratory is equipped for measuring of a wide range of elements.

Compound identification

The NMR spectrum reflects connection between atoms in the molecule, which makes the method ideally suited for identification of compounds.

NMR structural analysis in liquids

Complete 3D structure of compounds can be solved. However, the procedure may be laborious. Ask for details if you are interested.

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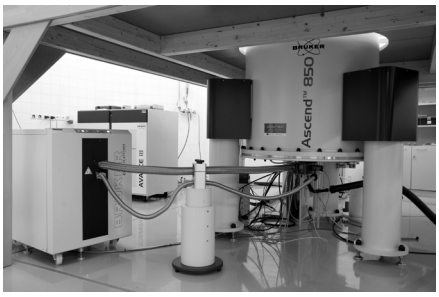
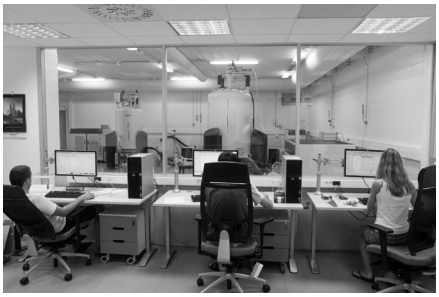
950 MHz NMR spectrometer with cryoprobe



850 MHz NMR spectrometer with cryoprobe



Operator room for the laboratory with 600 MHz and 700 MHz NMR spectrometers

Approximately 0,5 ml of sample with millimolar concentration is necessary for NMR analysis.

Biomolecular structure and dynamics by NMR

Proteins of up to 200 amino acids, nucleic acids up to 50 nucleotides can be studied. For solving 3D structures, isotope labeling with ^{15}N and ^{13}C is always needed for proteins and for oligonucleotides larger that approximately 30 nucleotides.

NMR analysis in solid state

The application of solid-state NMR techniques usually arises due to specific interest in the physics of solid state, including packing effects and polymorphic structures. We routinely measure 1D CP MAS spectra of ^{13}C, ^{15}N, ^{27}Al, ^{29}Si, and ^{31}P.

Equipment

- 950 MHz NMR spectrometer Bruker Avance III HD for high resolution spectroscopy in liquids, 5 mm triple-resonance (^{1}H-^{13}C-^{15}N) inverse cryoprobe
- 850 MHz NMR spectrometer Bruker Avance III HD for high resolution spectroscopy in liquids, 5 mm triple-resonance (^{1}H/^{19}F-^{13}C-^{15}N) inverse cryoprobe
- 700 MHz NMR spectrometer Bruker Avance III HD for biomolecular applications, 5 mm triple-resonance (^{1}H-^{13}C-^{15}N) cryoprobe optimized for ^{13}C detection
- 700 MHz NMR spectrometer Bruker Avance III HD for multinuclear applications in liquids and solids
- 600 MHz NMR spectrometer Bruker Avance III HD for high resolution spectroscopy in liquids, quadruple-resonance (^{1}H-^{31}P-^{13}C-^{15}N) inverse cryoprobe
- 500 MHz NMR spectrometer Bruker Avance for multinuclear applications in liquids and solids

Contact and Location

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