

Learning EPR with Magnostech ESR5000: Giving Students Hands-on Experience



Enhance your curriculum with an affordable and easy-to-use bench-top EPR instrument and open career doors for your students in fields such as biology, chemistry, medical science, materials science, forensics, etc. by teaching them the versatile technique of electron paramagnetic resonance (EPR) spectroscopy. The Magnostech ESR5000 is ideally suited for educational applications in EPR. The instrument offers research-grade results in a compact, portable design that features the user-friendly ESRStudio software.

Educational Kit for the Magnostech ESR5000

- EPR Primer with introduction to the basic theory and practice
- Suite of experiments for teaching EPR data acquisition and processing skills (with full instructions)
- Real life sample analysis in the classroom
- Lab accessory kit

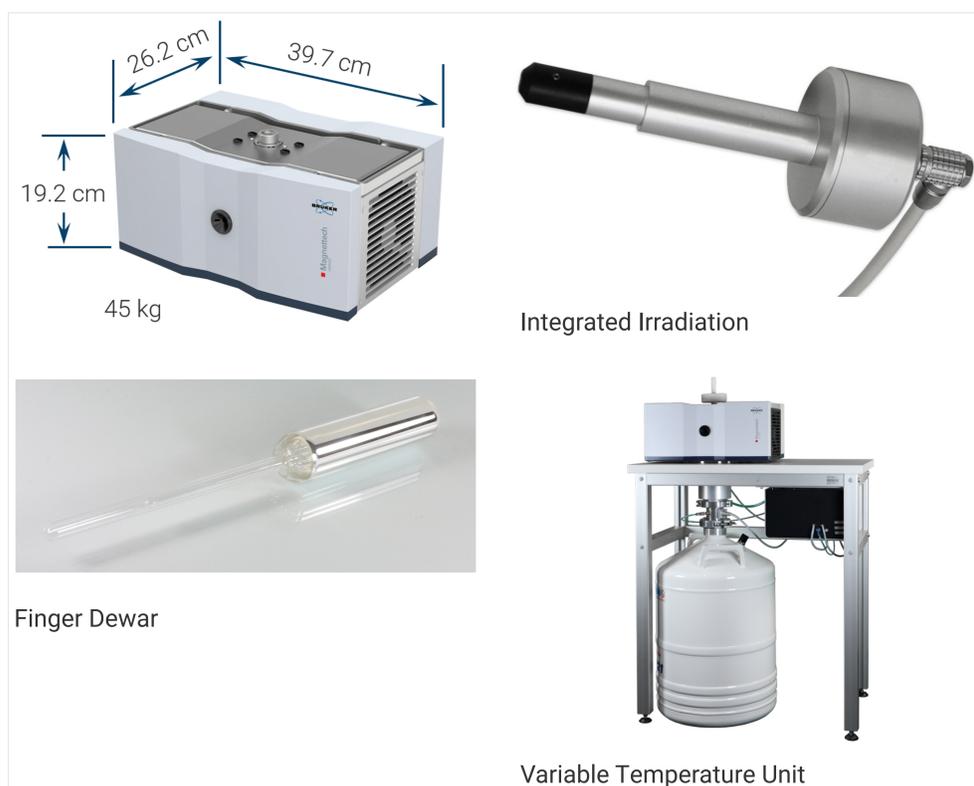


Fig 2: Magnostech ESR5000 and accessories

Educational Kit Experiments At-A-Glance

- **Acquiring spectra:** introduction to ESRStudio software with pre-selected parameters (recipes) and sample preparation
- **Real life samples:** students will run spectra on samples found in their everyday environment that contain radicals such as coffee, tea, cocoa, spices, etc.
- **Acquisition parameters:** effect of acquisition parameters such as microwave power, modulation amplitude, center field, sweep width, digital filtering, etc. on the EPR spectra, and how to optimize those
- **EPR fingerprints:** understanding the basics of EPR theory and how to determine g-factor and nuclear interactions with the unpaired electron in free radicals and transition metals
- **Kinetics:** monitoring radical reactions and using forced oxidation as a quality control analysis
- **Quantitative EPR:** learning the basics of quantitative EPR and how to perform relative quantification using a reference sample or using reference-free SpinCount module

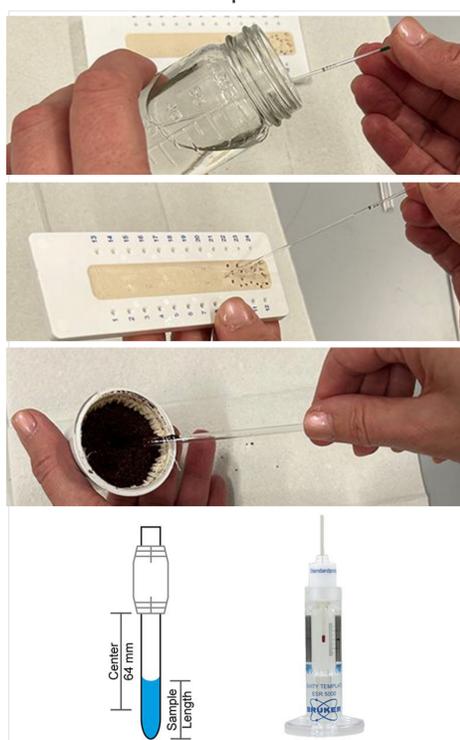


Fig 3: Sample handling

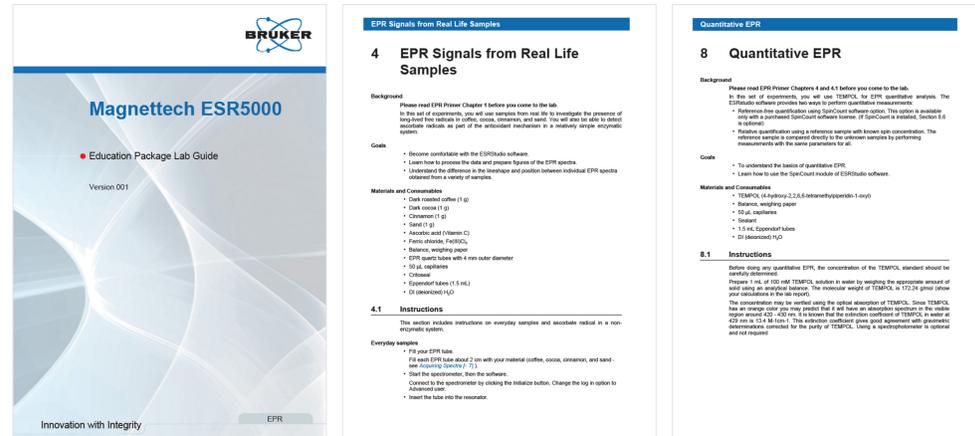


Fig. 1: Educational kit for Magnostech ESR5000

Why Choose the Magnostech ESR5000?

Any customer can confidently add or enhance their lab with real world EPR:

- Easy-to-use X-band continuous wave bench-top EPR spectrometer fully optimized for a magnetic resonance teaching environment
- Rapid automated tuning and measurement
- Dedicated recipes for various experiments and analysis
- Availability of versatile accessories
- Fully calibrated for quantitative analysis:
 - SpinCount – Reference free quantification of EPR species (Bruker patent)
 - SpinFit Liquids – Simulation and fitting of radicals and transition metal species in liquid state
- Spectral library of common species for radical identification

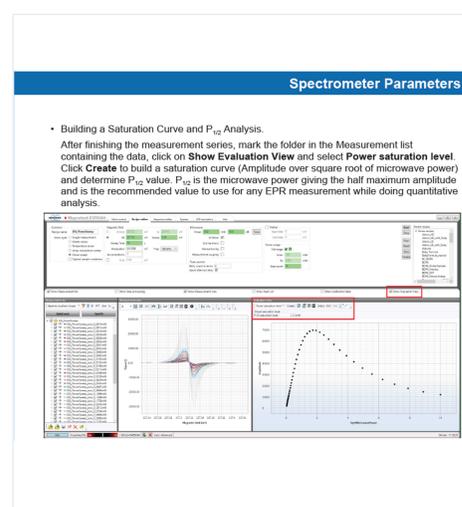


Fig. 5: Optimizing microwave power

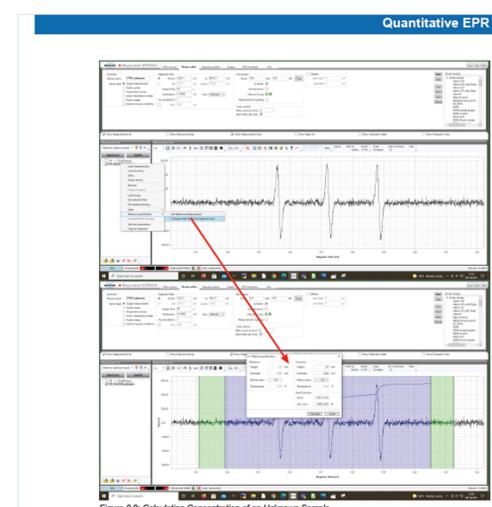


Fig. 6: Quantitative EPR

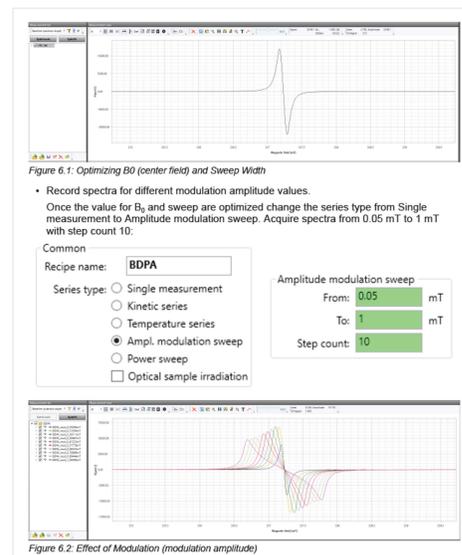


Fig. 4: Optimizing modulation amplitude

Conclusion

- With Magnostech ESR5000 educational kit, introducing EPR to the next generation is easier than ever.
- EPR theory and practical spectrometer control is presented with real world examples and samples.
- As the only technique to detect species with unpaired electrons, EPR crosses many disciplines, such as biology, chemistry, physics, medical science, and material science, opening career options.