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XANES spectroscopy

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The X-ray Absorption Near Edge Structure (XANES) region of XAFS spectra reveals critical insights into the electronic structure, coordination environment, and ligand symmetry surrounding absorbing atoms. These insights are uniquely accessible through XANES, as they are not typically obtainable using alternative techniques. Unlike Extended X-ray Absorption Fine Structure (EXAFS) data analysis, which benefits from established analytical models, XANES analysis is complicated by the multitude of influencing parameters and the absence of straightforward analytical approaches. Consequently, various methodologies have been developed to extract meaningful and reliable information from XANES spectra. This has led to the widespread application of XANES in investigating materials across diverse fields, including physics, chemistry, biology, medicine, geology, cultural heritage, and environmental sciences. This lesson will provide a comprehensive overview of both quantitative and semi-quantitative XANES data analysis methods, illustrated with specific examples.