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Advanced Electron Paramagnetic Resonance Spectroscopy for Structural Characterization

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Message from the Guest Editors

Dear Colleagues,

The aim of this publication is to study the relationship between electron paramagnetic resonance theory and the structural properties of solids, e.g., crystals. The paramagnetic ion can be treated as an active dopant or a kind of probe doped to the host, e.g., crystal lattice. In both cases, the experimental EPR spectra and their analysis give some knowledge about the structural position of the ion and its surroundings, local symmetry, deformation, the displacement of a dopant ion with respect to a substituted ion, similar or dissimilar pair formation, etc. This is especially important for future applications of the investigated materials such as laser diodes, phosphors, and scintillators. Theoretical calculations, based on spin-Hamiltonian parameter findings, are less expensive as compared to, e.g., crystal growth, and can give unique information about the structure of the investigated material. To date, only a few dopants have been analyzed using the superposition model, perturbation methods, or Newman g-shift model with the aim of finding the local structure of the doped material or the local symmetry of the doped ion. Additionally, the applied methods are not the only ones that can be applied to theoretical calculations of spin-Hamiltonian parameters.