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Getting More from Powder Diffraction Experiment: Modulation-Enhanced Diffraction

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Introducing a periodic perturbation of structural parameters of a given frequency results in a modulated diffraction response that may have a complex frequency spectrum. Frequency analysis of the diffraction signal allows untangling contributions from the average and varying part of the scattering density as well as interference between them; both model and real proof-of-principle experiments will be discussed. An analysis of advantages and drawbacks of the modulation approach will be given together with new opportunities for structure determination and refinement offered by MED for powder diffraction experiments with synchrotron radiation.

Keywords: powder diffraction, resonant scattering, modulation method