A Rigorous Analysis of the Scherrer Equation
S-Y Lee, IC Noyan*
Applied Physics and Applied Math, SEAS, Columbia University

The Scherrer equation which links the breadth of a diffraction peak at the half-maximum intensity (FWHM) to the thickness of the diffracting domains along the momentum transfer vector \( q \) is analyzed and tested. We derive this equation using multiple formalisms, using various peak shapes (Gaussian, Lorenzian, Pseudo-Voigt, Pearson V, VII, etc.) and show that when the fundamental assumptions inherent in the derivation are satisfied, this equation is remarkably accurate.