

Crystallite Size Analysis of Nanomaterials by Single Peak and Whole Pattern Fitting

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Crystallite size determination of nanodiamonds and nano-zincite particles were examined by X-ray diffraction (XRD). Single peak analysis utilizing the Scherrer equation along with whole pattern fitting was carried out. The main focus of this presentation will be to compare and contrast the two different techniques. Peak broadening due to micro-strain often competes with size broadening for larger particles, but adds little effect when crystallite sizes become small (<10 nm), as size becomes the dominant contribution. Williamson-Hall plots were generated for larger particles to separate out the effects of size from strain. XRD data was collected on a Rigaku D/Max 2200 with Cu k_{α} radiation utilizing a nickel filter. Acquired patterns were analyzed with Bruker's DIFFRAC.EVA software. Whole pattern fitting was performed with JADE 2010 from Materials Data Inc.