

Microstructural Studies of Nanocrystalline Materials Using WPPM

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Whole Powder Pattern Modelling (WPPM) is a recently proposed and continuously evolving procedure for the microstructural analysis of materials using X-ray powder diffraction [1-4]. The procedure is based on the analysis of the whole information contained in a powder pattern, without relying on an *a-priori* arbitrarily imposed peak profile function. Through the use of WPPM, microstructural features of nanocrystalline materials such as domain size distribution, quantity of line & plane defects can be obtained non destructively in a matter of minutes. Even if it can be used for the analysis of any sample, WPPM performs at best for nanocrystalline materials.

Ball milling is an easy and cost effective technique for the production of nanocrystalline powders. The deformation energy introduced in the powders during the milling causes both a reduction of the domain size and an increase in the defect content, features that can be easily monitored using WPPM. In this contribution, the application of WPPM for the analysis of nanocrystalline materials produced by ball milling will be shown and features/drawbacks with respect to traditional techniques, discussed

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