

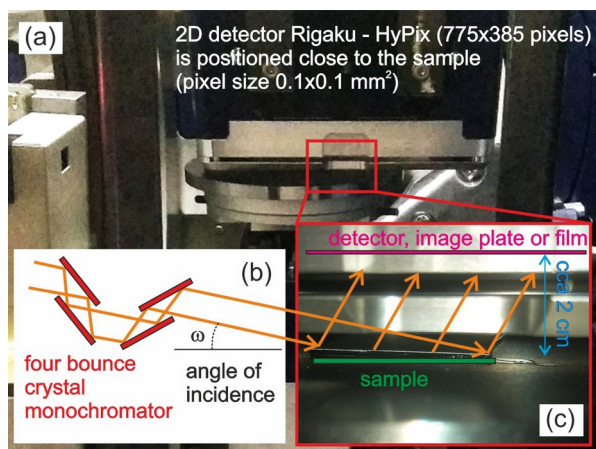
X-ray diffraction imaging of silicon carbide wafers

INTRODUCTION

This application list shows visualization of strain and surface damage in silicon carbide wafers using x-ray diffraction. The experimental technique is a natural extension of the classical x-ray diffraction topography method. The x-ray topography uses film as a detector. The usage of digital area detectors instead of film allows us to collect a series of images with respect to the angle of incidence; in fact diffracted intensity curve dependence (so-called rocking curve) is measured in every detector pixel. The rocking curves is usually a curve with a single diffraction peak. The collected data can be evaluated by means of various quantities; we have used angular peak position, peak width, maximal and integral intensity. The rocking curve imaging is performed in asymmetric grazing incidence diffraction which allows us for large irradiated area.

INSTRUMENT

Fig. 1 shows an experimental setup for the rocking curve imaging. The detector is positioned close to the sample.



▲ Fig. 1: Photography of the actual setup (a). Scheme of the beam path in monochromator (b) and sample (c).

REFERENCE

[1] M. Meduňa, O. Caha, E. Choumas, F. Bressan, and H. von Känel, submitted to J. Appl. Crystallography.

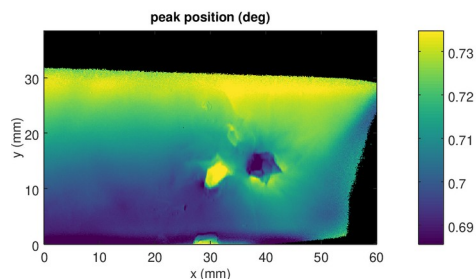
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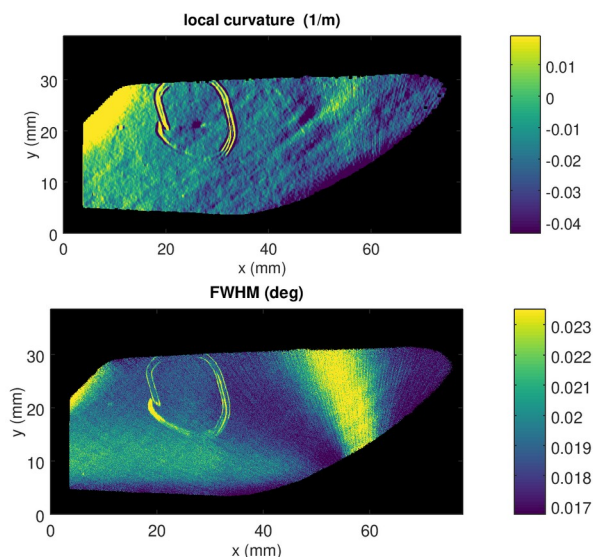
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EXAMPLES

The experiments presented in figures 2 and 3 were performed in diffraction 1126 at angle of incidence of 0.7 deg.



▲ Fig. 2: Peak position map showing misoriented grains in SiC.



▲ Fig. 3: Single area of SiC wafer. Top panel: peak position derivative with respect to x axis (local curvature) showing crack in wafer. Bottom: peak width as FWHM showing polishing scratches.

ACKNOWLEDGEMENT

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