Experiment title: X-ray investigation of Silicon/Germanium nanocrystals on Silicon carbide

Beamline: BM20

Experiment: Si 622 **Date of experiment**: from 31/01/2001 to 04.02.2001

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The aim of the experiment was to investigate the habit, size, arrangement and constitution of Si- and Ge-nanocrystals which were grown by molecular beam epitxy on SiC(0001)-substrates using the Stranski-Krastanov growth mode. For these purposes, high resolution x-ray diffraction measurements were carried out using the new material research goniometer of the CRG-beamlline ROBL. The performed measurements were successful in acquiring of significant results which are well suitable to characterize the grown nanocrystals.
The results were already published in the journal of **Thin Solid Films 380 (2000) 86-88**

Si/Ge-nanocrystals on SiC(0001)

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Abstract
The growth and structure of Si- and Ge-nanocrystals was investigated using high resolution X-ray diffraction (HRXRD) and atomic force microscopy (AFM). AFM-images were used to determine the lateral and vertical dimensions of the nanocrystals. HRXRD measurements show clearly that Si- and Ge-nanocrystals grow on 6*H*-SiC(0001) preferentially in two different orientations - <111> and <110> - with respect to the surface normal. The growth of Ge-nanocrystals on Si-rich 6*H*-SiC(0001) surfaces leads to the formation of Si/Ge-alloy nanocrystals. Both types of nanocrystals grow coherently with respect to the substrate. Hence, due to the respective lattice mismatch, the degree of coherence was found to be much better for Si-nanocrystals.