

**Experiment title:**

The microstructure of amorphous silicon studied by small-angle X-ray scattering

Experiment number:

HC-39

Beamline:

ID13-BL1

Date of Experiment:

from: 7/12/94 **t o:** 11/12/94

Date of Report:

21 March 1995

Shifts:

12

Local contact(s):

Christian Riekkel

Received at ESRF

Names and affiliations of applicants (*indicates experimentalists):

M J van den Boogaard (*)

Universiteit Utrecht, Debye Institute
Dept of Atomic and Interface Physics
PO Box 80.000, NL-3508 TA UTRECHT, the Netherlands

H C Gerritsen

Universiteit Utrecht, Debye Institute
Dept of Molecular Biophysics
PO Box 80.000, NL-3508 TA UTRECHT, the Netherlands

Report:

During the first three shifts of our experiment X-rays were not available. This time was used to adapt the experimental setup on station ID13 to our needs. The cross-section for small-angle X-ray scattering by our samples, thin films of hydrogenated amorphous silicon, is small. Therefore our main objective was to remove any additional sources of scattered radiation from the beam path. Our samples were placed in a vacuum that extended from several meters toward the storage ring to immediately in front of the gas-filled 2D detector. Except for our samples, the only remaining scattering object was a kapton foil, placed in the beam at 45°, approximately 80 cm from the sample holder and used in conjunction with a photodiode as a beam-intensity monitor.

Six shifts were necessary for the careful alignment of the new setup and for an optimization of the signal-to-noise ratio of the spectra.

Three shifts were used for pilot experiments. These revealed that two aspects of the setup need to be improved in order to enable accurate experiments on hydrogenated amorphous silicon.

- The SAXS camera and the sample holder have to be mechanically decoupled from the system of beam slits.
- A method of integration of the beam intensity with a higher accuracy than currently available is required for the normalization of the spectra.

These two problems are being addressed and work on an improved setup is in progress.