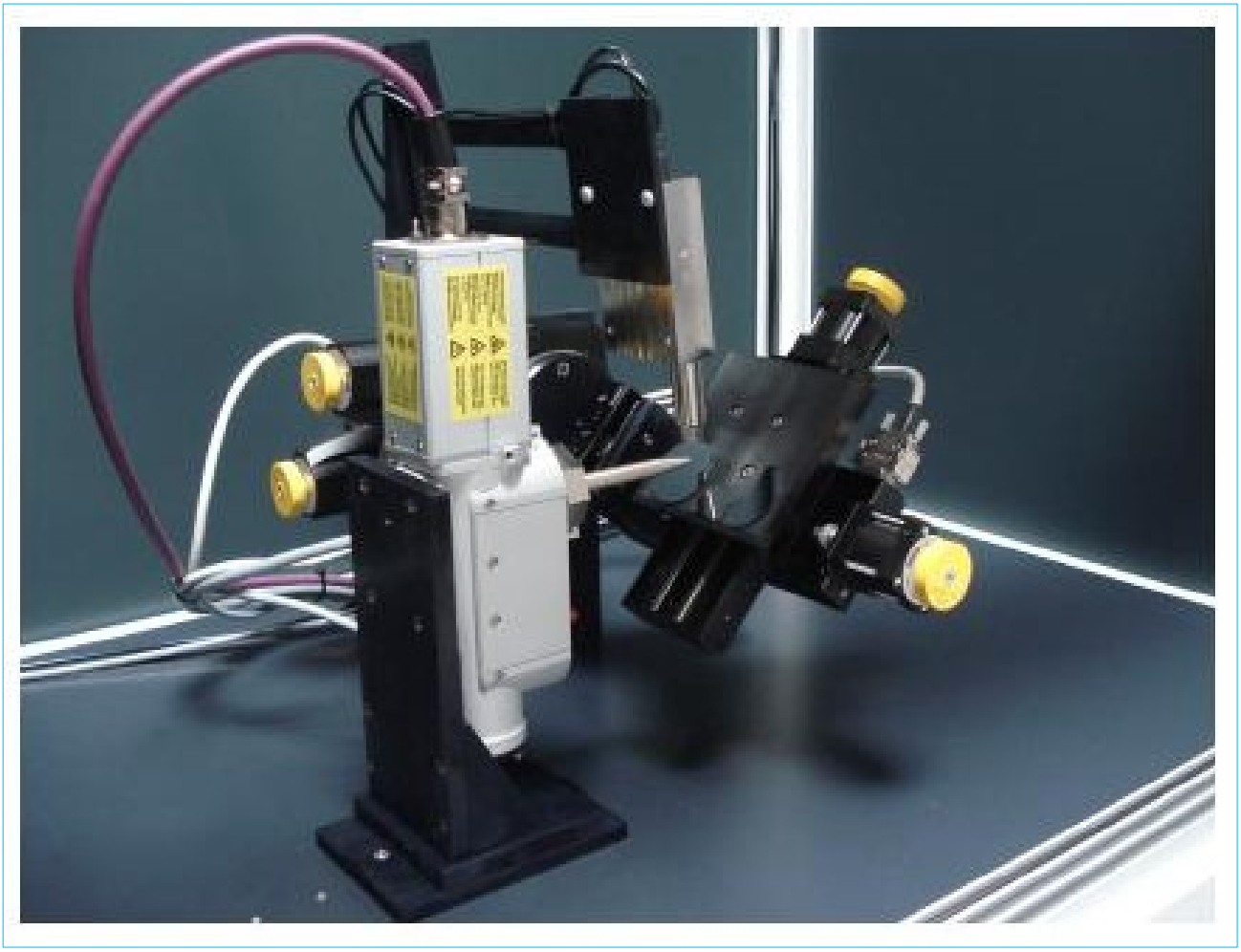

Contactless full scale semiconductor wafer chemical composition scanner

EURO-X-SCAN

CONTACTLESS FULL SCALE SEMICONDUCTOR WAFER CHEMICAL COMPOSITION IMAGING BY CAPILLARY FOCUSED X-RAY MICRO BEAM FLUORESCENCE.

X-ray fluorescence is a widely used technique for chemical composition analysis.

The fluorescence is generally excited through a shielded X-ray beam or an electronic microscope, however the shielding reduces drastically the beam intensity and the electronic microscope needs vacuum operation.During the growth of compound semiconductor crystals, both deviations from composition are observed, resulting from microscopic changes (for example due to the segregation coefficients) as well as microscopic scale (non-uniformity , precipitates, etc…).

These composition changes have drastic effects on the characteristics of the materials and consequently on the performance of the devices.

EURORAD

www.eurorad.com
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EURO-X-SCAN

NO DIRECT CONTACT WITH THE WAFERS

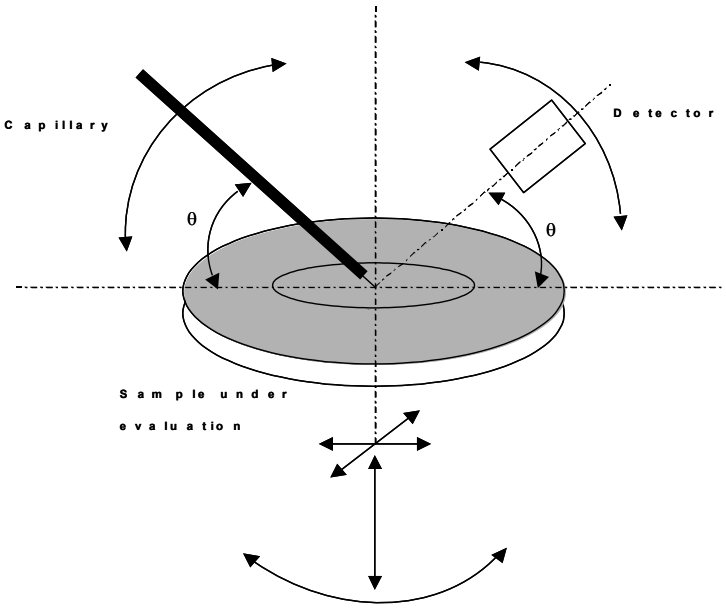
THE STANDARD VERSION OF THE INSTRUMENT is able to measure with a spacial resolution of typically 20µm the X-ray excited fluorescence lines of the chemicals, without any physical contact on a full scale wafers by scanning.

But, besides semiconductor wafers, the EURO-X SCAN can be used to analyse with a high local resolution any solid surface.

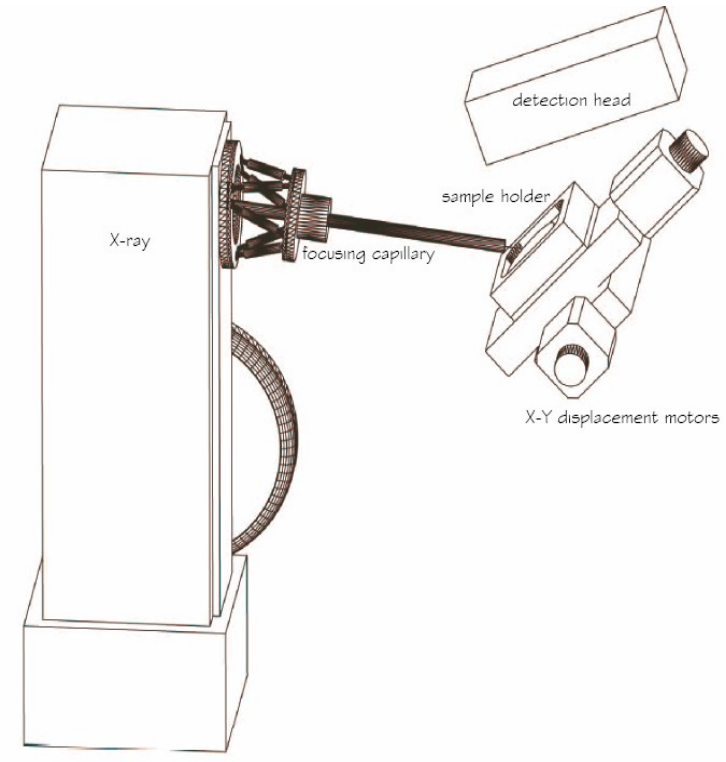
THE PRINCIPLE OF THE MEASUREMENT is to excite locally the characteristic X-ray lines by a beam of X-rays given by a tube and having been focused to diameters in the range of 20µm through a special capillary.

THE INSTRUMENT CONSISTS OF THE FOLLOWING PARTS:

- **an X-ray generator coupled to**
- **a capillary tube, based on critical angle full reflectivity of the photons**
- **a computer controlled X-Y displacement system**
- **a high resolution dispersive semiconductor spectrometer, X-ray spectroscopy system operating at RT**
- **a PC based software**



Principle of the method



Technical shematic of the system

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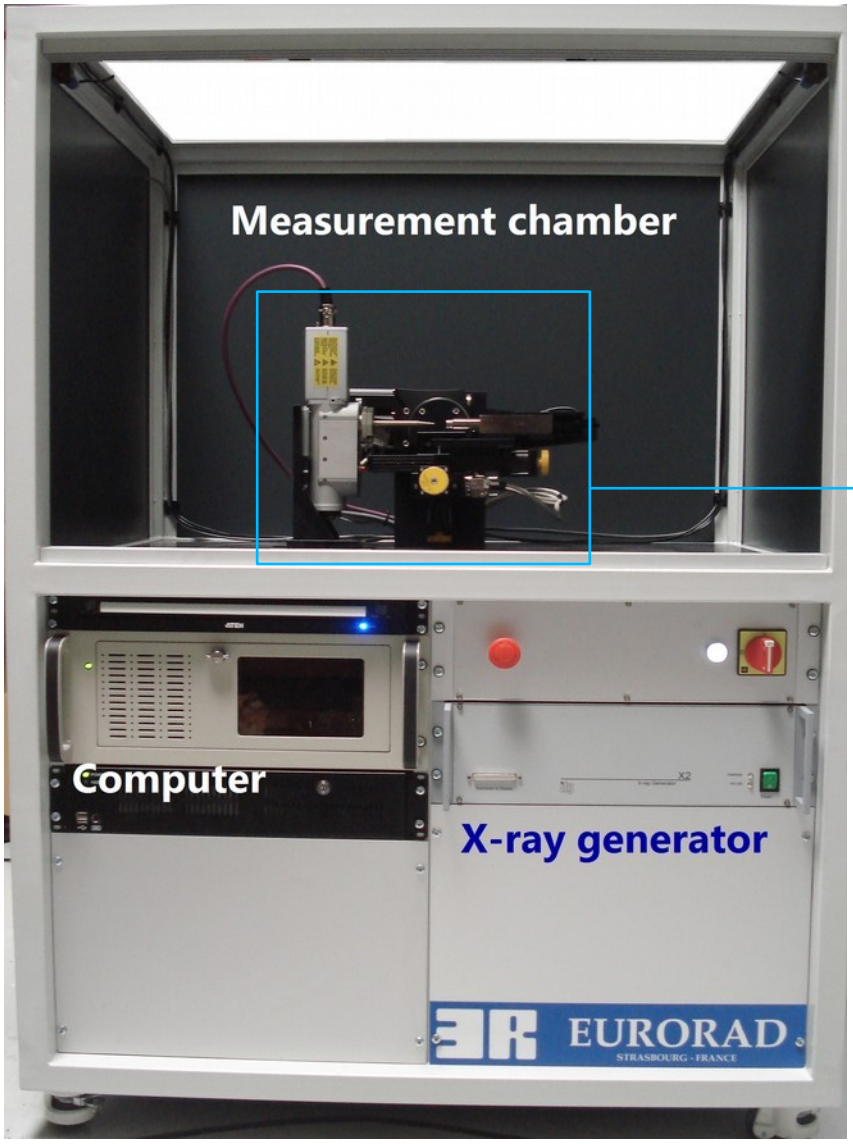
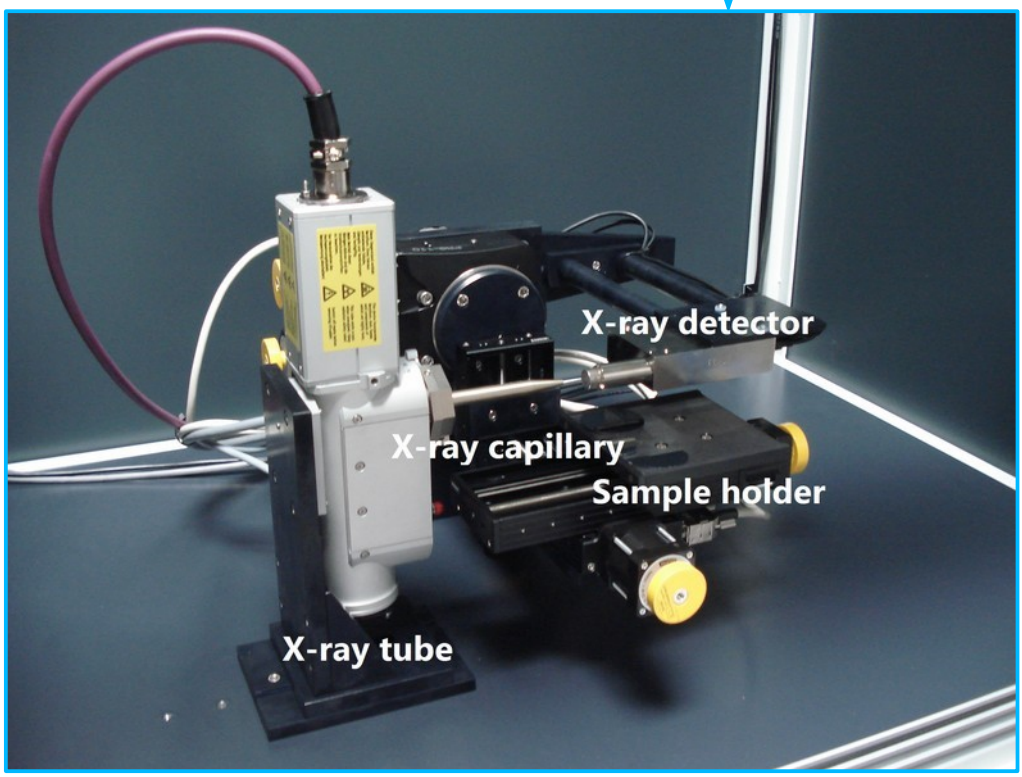
EURO-X-SCAN



THE EURO-X-SCAN MEASUREMENT SYSTEM

THE EURO-X-SCAN MEASUREMENT CHAMBER



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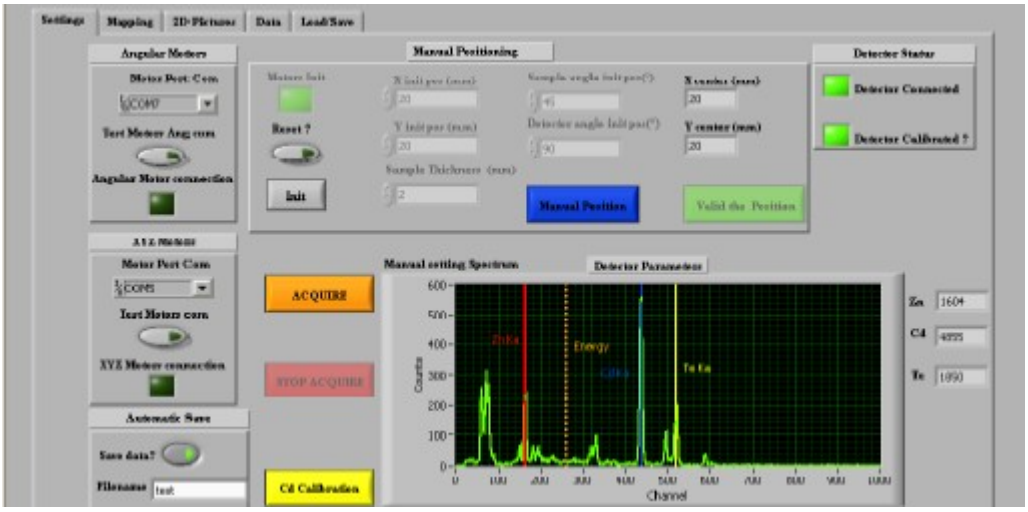
EURO-X-SCAN

RESULTS

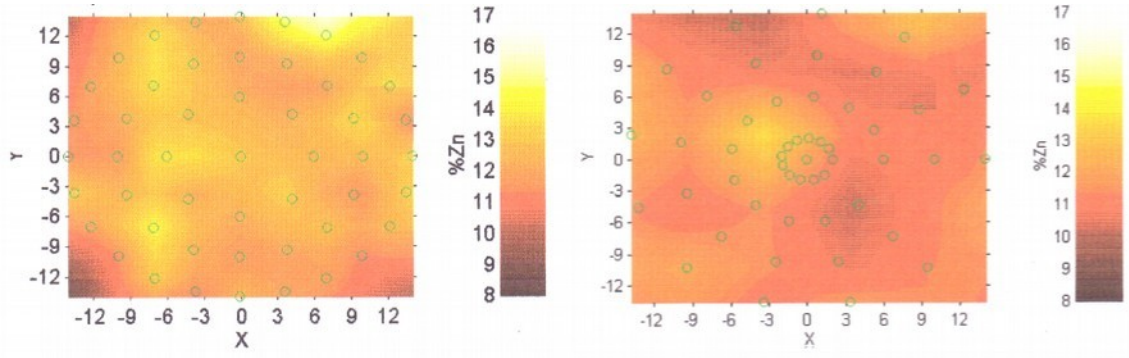
To illustrate the possibilities of the instrument, CZT (CdZnTe) wafers have been analysed, cut both perpendiculary and parallel to the growth direction.



Control & measurement window

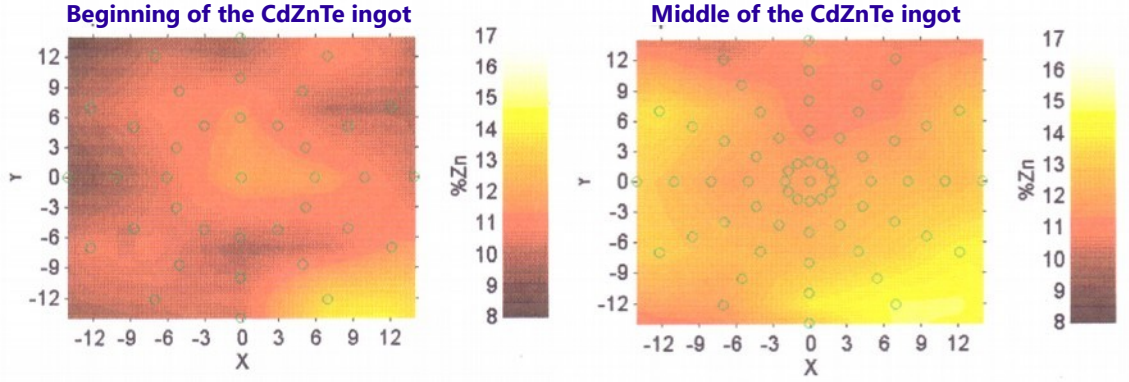
2D (Zn) MAPPING OF CdZnTe WAFERS

to vizualize changes in the Zn concentration over the whole ingot



Beginning of the CdZnTe ingot

Middle of the CdZnTe ingot



End of the CdZnTe ingot

Transversal wafer of the CdZnTe ingot

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