

Technical COLLOQUIUM

Date: April, 18 2013

Program: X-ray methods for the characterization of layered structures

Speakers: Woitok J.F. and Koster, G.J.

Every third Thursday of the month MESA+ Institute for Nanotechnology organizes a technical colloquium. The aim of the technical colloquia is to convey expertise and know how of the various equipment and technology within NanoLab.

Today's technologies for electronic, optical, mechanical and energy devices are increasingly driven by the engineered development of advanced materials. One of the key aspects is the progress in growth technologies for the deposition of thin-layered structures with thicknesses down to the nanometer range. Typical materials that are involved are semiconductors, metal alloys, dielectrics and also polymers. The characterization and monitoring of the properties of a material are significant for its application and essential for further development and improvement.

X-ray diffraction has been appreciated in research and analytical labs for a long time due to its nondestructiveness and versatility to study structural properties of materials of any kind. In recent years other relevant X-ray techniques evolved to meet the upcoming requirements: high-resolution diffraction, grazing-incidence diffraction, reflectometry, diffuse scattering and small angle scattering.

From the scattering data, information can be extracted to identify and quantify phases, to determine composition and strain profiles, thickness, roughness, density, grain size, residual stress and preferred orientation. While in the past for each analysis method dedicated instruments were applied modern lab equipment with exchangeable optics offers all techniques on one single instrument. In this presentation an overview will be given about the experimental aspects and evaluation process of X-ray methods. Their applicability to extract structural information of advanced layered structures is illustrated on a range of examples of technologically relevant materials. A special focus will be on the recently installed X'Pert PRO MRD and X'Pert Powder instruments at the Nanoelectronic Materials group.

Start: 15:45 - 16.15 hrs. Location: Carre 2506

Discussions/drinks: 16:15 - 17:30 hrs.

You are kindly invited to attend the MESA+ Technical Colloquium. After the colloquium you can have a drink and take part in informal discussions.

MESA+ is one of the largest nanotechnology research institutes in the world, delivering competitive and successful high quality research. It unites scientific disciplines, and builds fruitful international cooperation to excel in science and education. MESA+ has created a perfect habitat for start-ups in the micro- and nano-industry to become established and then mature.

The institute employs 525 people of whom 300 are PhD candidates or postdocs. With its Nano-Lab facilities the institute holds 1250 m² of cleanroom space and state of the art research equipment. MESA+ has been the breeding place for more than 45 high-tech start-ups to date. www.utwente.nl/mesaplus

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