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Practical examples of the benefits and limitations of TEM

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Abstract:

TEM is a powerful tool for materials analysis at the nano-scale offering unmatched spatial resolution combined with chemical analysis. I will present a series of interesting examples where TEM offered valuable insight in research conducted at the Centre for High Resolution Electron Microscopy. A popular trend at the moment is that of in-situ microscopy with the aim of simulating dynamic conditions that materials may experience while in use, inside the microscope column. While the idea is very promising, the effect of thin film relaxation, energy deposition by the electron beam and other factors imposed by the microscope column may lead to significant variation in the observed behaviour of materials in- and ex-situ.

Bio:

With the birth of the centre for high resolution TEM in 2010, Jacques was identified as a candidate for the role of electron microscope engineer at the centre. In this position he would be responsible for the general maintenance and optimisation of the centre's microscopes and supporting instruments. For this he joined JEOL UK for several months in 2010 where he shadowed TEM engineers throughout England while installing and servicing various instruments and attachments. He attended engineering courses at Oxford instruments as well as FEI headquarters in Eindhoven. After returning to South Africa he obtained his Ph.D. in physics in 2013 at NMU studying silver migration through SiC containment layers in TRISO fuel particles used in pebble bed nuclear reactors. His expertise lies in electron microscopy and related techniques with specific interest in the study of high energy heavy ion damage in insulators. He is a member of the Microscopy Society of Southern Africa and member of the international committee for the biannual conference on the interaction of irradiation with solids. His current focus is on recovery kinetics of swift heavy ion tracks in amorphizable crystals..