



Nano diffraction (NBD)

Institution: University of Vigo

Scientist in charge: Luis M. Liz-Marzán

Nano diffraction (NBD)

Nanodiffraction is a special form of convergent beam electron diffraction (CBED) in which the emphasis is on obtaining diffraction patterns from regions of the specimen about 1nm or less in diameter. Unless a field-emission gun (FEG) is used, the intensity in a beam 1nm in diameter is too small to be useful. Hence nano-diffraction has been performed mainly in dedicated STEM instruments having cold FEG sources, although the newer TEMs with FEGs may also be used. Efficient two-dimensional detector systems and recording with TV or CCD cameras, as on our VG HB-5 STEM, are important. Electron beam diameters may be as small as 0.2nm.

Possible Applications

- Structure analysis of very small particles (e.g. metal particles in catalysts)
- Studies of defects (e.g. twins and dislocations) and disorder in very small particles⁴
- Structure of individual defects in thin crystal foils
- Determining local order in thin films of near-amorphous materials or disordered crystals
- Determination of local symmetry within particular parts of a unit cell of a crystal or a defect
- Combining local structure analysis with bright-field or dark-field STEM imaging or microanalysis by EELS and EDX with high spatial resolution or imaging with secondary or Auger electrons

Specimen Requirements

Thin specimen foils or well-dispersed particles on thin film supports. Specimens should be cleaned to reduce contamination, e.g., by baking in air or vacuum, or use of plasma cleaner.

Source: <http://www.asu.edu/clas/csss/chrem/Techniques.html>