

Crystal Structure Solution at The Nanoscale - The Power of Electron Diffraction

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The use of electron radiation allows to collect information from a nanoscaled volume. In particular electron diffraction demands significantly lower electron dose in comparison to imaging methods providing comparable resolution. With the development of Automated electron Diffraction Tomography (ADT) three dimensional electron diffraction data close to kinematical behavior became available allowing a direct crystal structure analysis from single nano crystals. The key ideas to kinematic diffraction data, is to use nano crystals without orienting them to the electron beam and to scan the reciprocal space fully in the regime of mechanical limits. The electron crystallographic community is vivid and constantly growing and significant improvement was made in data acquisition, processing and analysis tools dedicated to electron diffraction. Different approaches are available nowadays, summarized under the term three dimensional electron diffraction (3DED) all following the described basic principle. Here an insight into the applicability of 3DED to different material classes is presented and the solution of specific crystallographic questions are demonstrated.