



NANOCARTOGRAPHER COMPUTER PROGRAM

Doubles as a digital notebook and provides rapid analysis tools

Since the invention of electron microscopy, scientists have sought different protocols to examine microstructures, microchemistries, and morphologies of all materials.

NanoCartography is a new paradigm shift that ushers science back into the realm of microscopy. Each sample is its own experiment, and by providing tools to map samples structurally, identical experiments are easily repeatable.

A BETTER DIGITAL NOTEBOOK

Researchers at Pacific Northwest National Laboratory have developed a powerful, standalone computer program that doubles as a digital notebook and provides microscopists with rapid analytical tools. NanoCartographer, which is available for licensing, quickly maps known and unknown crystalline structures in relation to the entire TEM (transmission electron microscope) foil with pinpoint precision at the nanoscale.

By procuring sample maps, NanoCartographer enables users to repeatedly re-analyze samples, regardless of orientation upon reloading. Collaboration and data sharing is made simple by providing other scientists with a map of collected sample data. The nature of the geometric calculations utilized by NanoCartographer only requires access to a double tilt holder, regardless of microscope. Rapid, precise, and, most important, **repeatable** data collection is only a click away with NanoCartographer.

UNIQUE FEATURES SET NANOCARTOGRAPHY APART

NanoCartographer, Version 1.0, runs on the Microsoft Excel platform and offers a variety of benefits and features.

Precise Crystal Tilting of All Seven Crystal Systems

- Tilt maps for any crystal system, including all possible zone axes, as well as any desired crystallographic plane.
- On-the-fly adjustments of lattice parameters to tailor maps to collected data.
- Tilt limitations to provide knowledge of the tilt stage.

Unknown Crystal Generator

- Play detective and map out unknown crystalline materials to solve the most difficult structures.
- Using diffraction or Kikuchi patterns, build traces of your own crystal to help solve the structure.

Accurate Tilting of Non-Crystallographic Features

- Apply complex, oblique stage tilting movements to grain boundaries, interfaces, surfaces, and crystalline facets.
- Tilt samples in any desired orientation to preferentially match interface alignments to adjacent crystals.

Predictive Grain Boundary Analysis

- Regardless of orientation, with only two tilt conditions, determine not only the grain boundary on-edge condition, but the sample thickness, as well.
- For fine precision tilting of near “on-edge” grain boundaries, a small angle tilt calculator also is provided for when you are “almost there...”

Grain Boundary Type

- Using the Crystal Tilting module, derive local grain boundary misorientations and axes with the push of a button, without the need for electron backscatter diffraction or precession electron diffraction techniques.
- Perform complete grain boundary analysis by describing type, not just simple chemical analysis.

Crystal/Interface Calculations

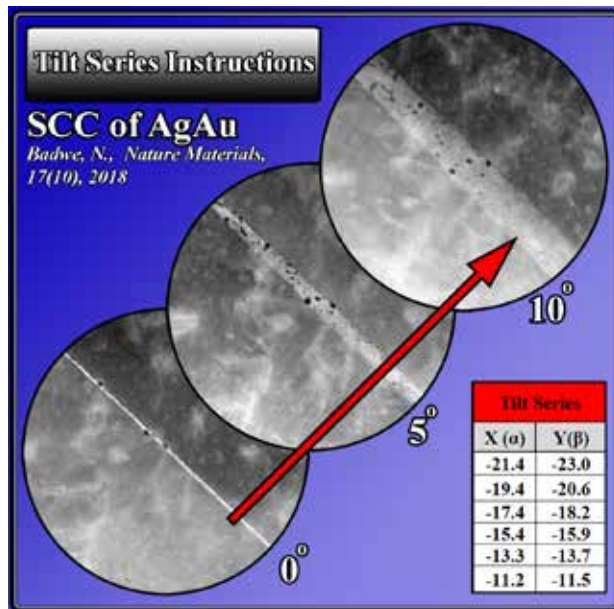
- Determine crystallographic orientations to interfaces using the Crystal Tilting module.
- Describe growth directions of films or interfaces.

Tilt Series Calculator

- Collect tilt series along logical tilt axes of any interface regardless of orientation.
- Allow your audience to do the microscopy with you as you provide them a glimpse of the 3-D nature of your sample.
- Combined with Crystal Tilting module, create crystal-specific tilt series, such as 3-D dislocation imaging.

Mapping and Rotation Predictor

- Develop full orientation maps of every sample.
- Plan out new experiments during post-preliminary analysis.
- Share crystallographic mapping information with other researchers for rapid and easy collaboration.
- Keep meticulous notes on chemical mapping and other important session info to aid in future report and paper writing.



NanoCartographer is a powerful, standalone computer program that doubles as a digital notebook and provides microscopists with rapid analytical tools.

AVAILABLE FOR LICENSING

NanoCartographer is available for licensing in all industry applications. PNNL also is looking for research collaborations to advance the technology.

For more information, contact the following:

Research Collaborations, contact the developers:

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