

ASTAR: Orientation & Phase Mapping with nm Resolution

ASTAR combines Precession Electron Diffraction (PED) with orientation or phase mapping allowing the characterisation of crystalline materials resulting in maps with a special resolution down to 1 nm (specimen dependent).

10 nm

ASTAR

HREM

EELS

HAADF

STEM

Precession
Electron
Diffraction

HAADF

CBED

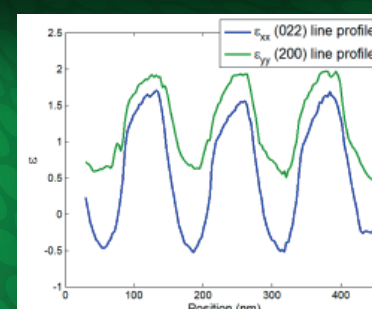
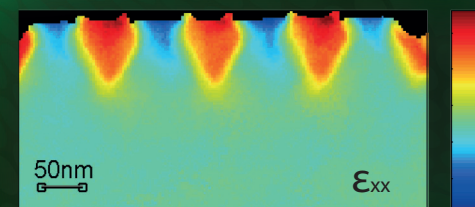
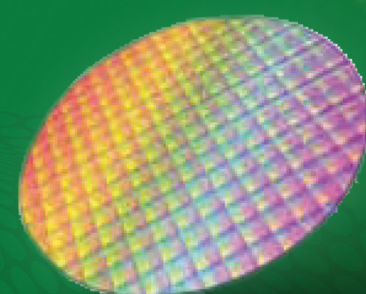
EDS

HREM

Orientation map of Au nanoparticles,
courtesy Dr. M. Gemmi IIT Pisa

www.nanomegas.com

TopSPIN Strain: Strain Mapping & Analysis with High Precision and nm Resolution



TopSPIN Strain combines Precession Electron Diffraction (PED) with automated strain mapping and analysis of diffraction patterns by comparing unstrained and strained areas in the same crystalline sample (Patent Pending). This technique has the unique advantage of achieving high precision (0.02%) and a spatial resolution down to 3 nm (specimen dependent).

TopSPIN
Strain

S-HREM

EELS

HAADF

HOLOGRAPHY

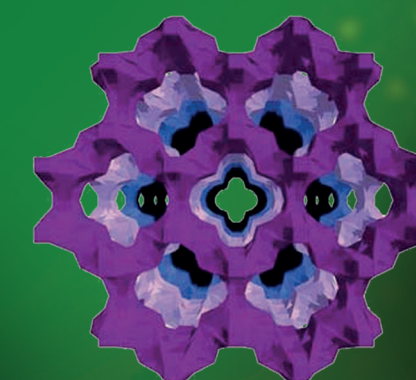
Image
Tomography

CBED

Strain map from the Si region of a pMOS device

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ADT-3D: Automated Precession Electron Diffraction Tomography for Solving Crystal Structure



Unit Cell
Atomic Coordinates

Si1	0.00000	0.16000	0.00000
Zn1	0.30000	0.34200	0.01000
O1	0.00000	0.00000	0.00000
O2	0.16100	0.18700	0.85000
O3	0.00000	0.18700	0.30500
O4	0.25000	0.50000	0.85000
O5	0.00000	0.50000	0.30500

ADT-3D uses a Precession Electron Diffraction (PED) acquired tilt series of 2D off-zone patterns from a nanocrystal and transforms them into a 3D diffraction volume. Automatic clustering and manual routines are then used to determine the unit cell parameters. The extracted intensities can then be used find a structural solution, using direct methods, producing a three-dimensional atomic structure of the crystal.

ADT
3D

S-HREM

EELS

HAADF

HOLOGRAPHY

Image
Tomography

CBED

Crystal structure of mesoporous ITQ-43,
courtesy Dr. F. Rey ITQ Valencia

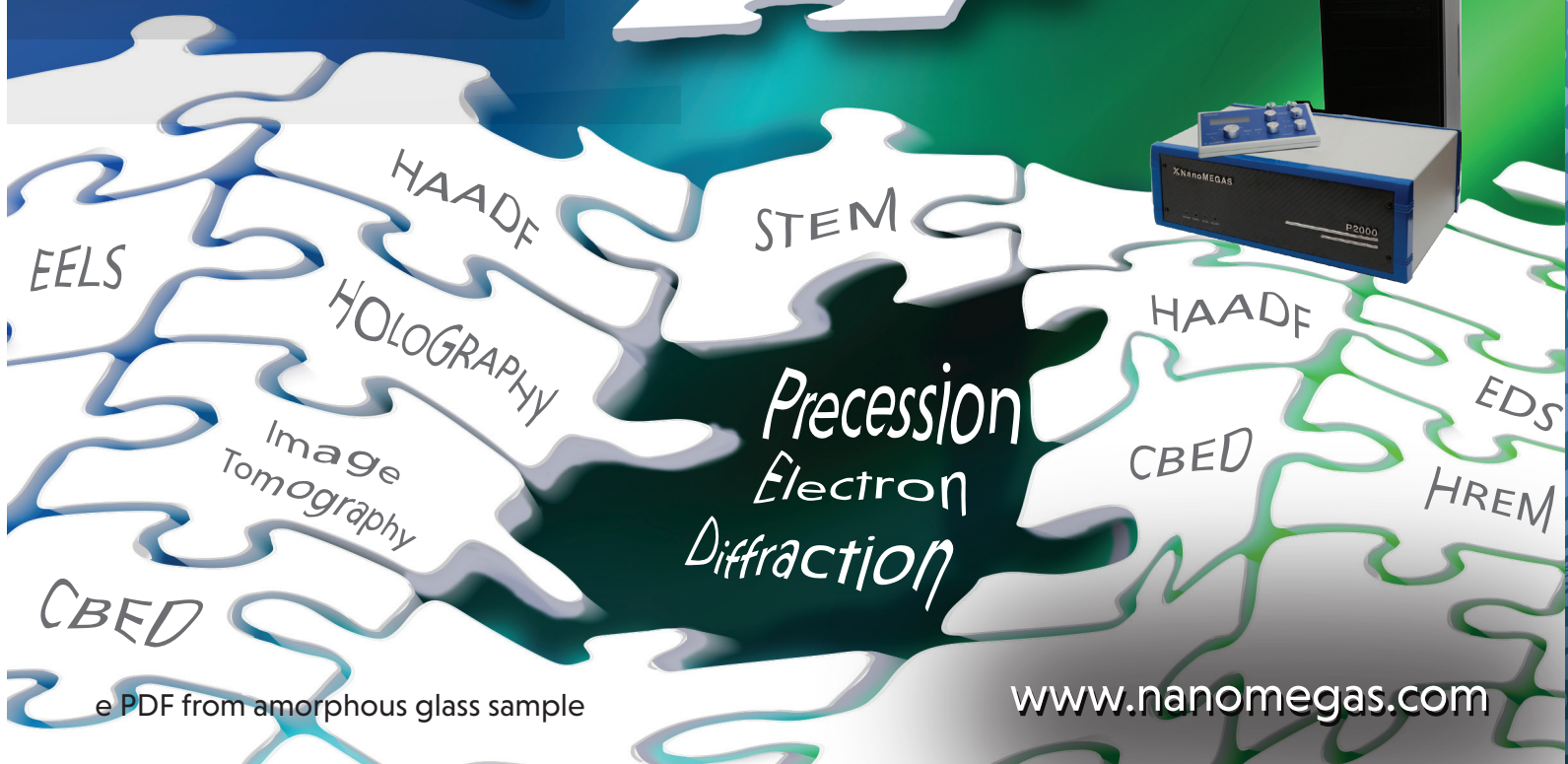
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e-PDF: Electron Pair Distribution Function for Amorphous Materials analysis

(e-PDF) is an electron diffraction based technique that allows to analyze local order in amorphous and nanocrystalline materials from diffuse or ring ED patterns.

e-PDF data can be acquired with any TEM and can be applied to characterize amorphous semiconductors, glass, amorphous minerals, battery materials and in situ studies in liquids in environmental cells.

ePDF



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e PDF from amorphous glass sample

Expanding TEM Analytical Potential with Precession Electron Diffraction

NanoMEGAS
Advanced Tools for electron diffraction

Orientation & Phase Mapping

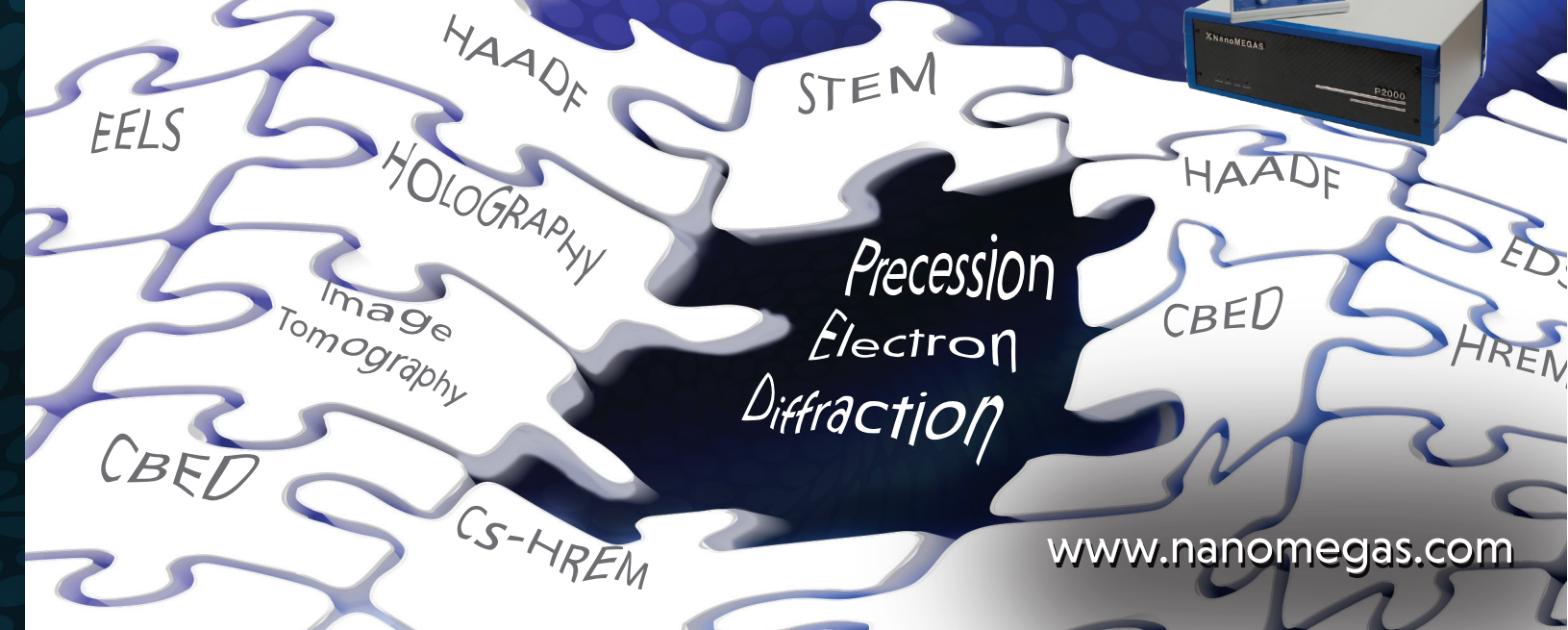
ASTAR

Strain Mapping

TopSPIN Strain

Automated Electron Diffraction Tomography

ADT 3D



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