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CURVED CRYSTALS

Atomically Defined Surfaces

Working Principle

Enabling multi-vicinal surface analysis. All surface orientations in a single sample.

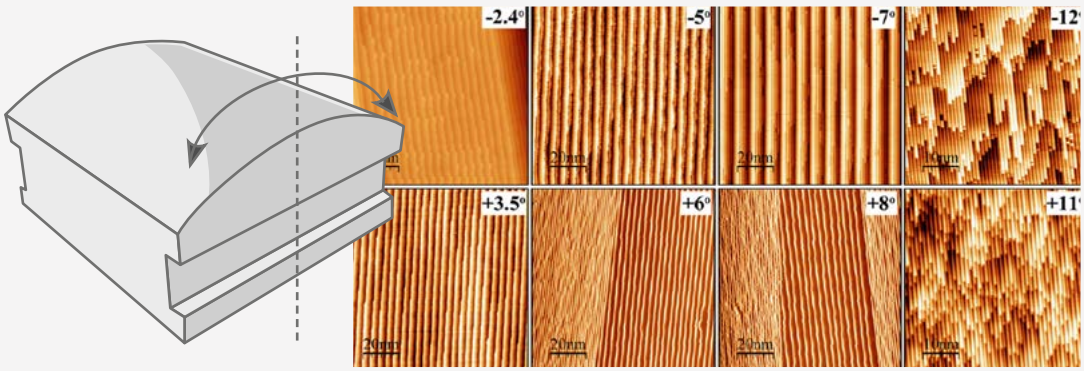
Vicinal surfaces are those oriented a few degrees off from a high-symmetry direction. They are characterised by a high density of atomic steps, which strongly influence many physical-chemical properties. Steps, for instance, are active sites in surface chemistry and catalysis. They interplay strongly with thin film growth, by introducing uniaxial properties in the film, driving step-flow and/or fixing single azimuthal domains. Arrays of steps are frequently explored as templates for guiding self-organization of one-dimensional (wire, stripe) and zero-dimensional (nanodot) nano-objects.

On a curved surface the macroscopic vicinal surface orientation determines the nanoscopic density of linear steps and can be engineered to vary smoothly in a selected range.

Curved surfaces offer important advantages, especially when combined with automated scanning-probe set-ups:

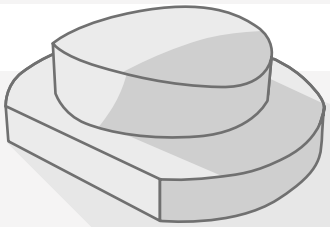
They allow preparing and studying many different surface orientations in a single shot, drastically reducing the amount of resources and time required for the measurements.

They provide a rational framework for exploring surface science of exotic surface orientations, and tuning chemical-physical dependent properties.



Scanning tunneling microscopy images taken at different positions on an Au curved crystal. The main direction (indicated by the dashed line in the crystal on the left of the Figure) is (111). The numbers on the upper right hand corner of each figure indicate the angle (with respect to the main direction). Courtesy of M. Corso (CSIC-UPV/EHU, San Sebastián, Spain)

Features



Wide range of materials
All metallic materials and a wide choice of oxides and alloys available.

Selection of vicinal range
The range of vicinal surfaces can be selected through engineering of the surface curvature.

Customized shape
Steps, grooves and drills can be directly inscribed in the monocrystalline sample, easing clamping and placement of probes, coils, etc.

Choice of holders and standard mounts
Samples can be easily integrated into any experimental set-up.

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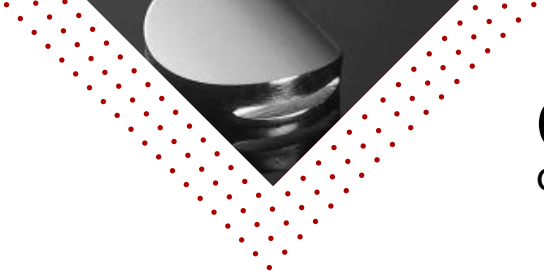

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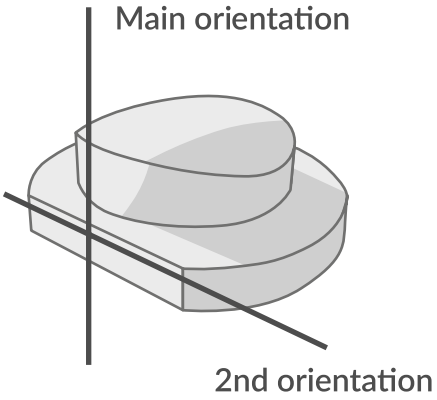
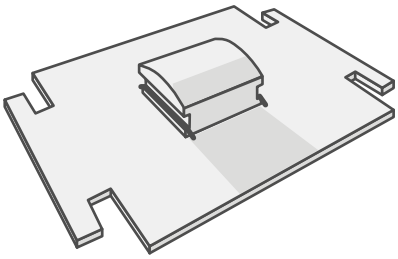
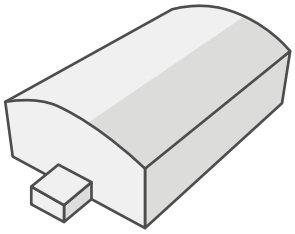
Technical Specifications

Materials	Metals: Au, Ag, Cu, Pt, Pd, Rh, W, Ru, Si, Ge, Ta, Mo, Ti, Th,... (other materials upon request) Wide choice of Alloys and Oxides available.
Structure	Monocrystalline
Purity	From 3N5 up to 6N, depending on material
Crystal orientation	• Main Orientation (see Figure on the right). • Standard for cubic: (001), (110), (111). • Standard for hexagonal: (0001), (10-10), (11-20). • Other orientations available upon request.
Orientation accuracy	• As cut (typically < 2°) • < 1° • < 0.5° • ~ 0.1°
Shape & Size	• Customized geometries (see figures on the right for example). • Radius of curved surface from 13 to 60 mm. • Dimensions up to 100 mm in any direction (material dependent). • Back surface polished upon request.
Surface Roughness	Down to 0.3 µm





Curved Crystals can be provided mounted in adaptors for easy integration of the sample into your system.



Applications

- Surface reactivity
- Surface catalysis
- Templates for quantum dot structures
- Templates for molecule polimerization
- Graphene and 2D-material growth

Curved Crystals are highly customised products fully adapted to your particular needs. For more information, technical advice and examples of applications please visit **www.bihurcrystal.com** or contact us at **info@bihurcrystal.com**

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