

GrainMapper3D™

Reconstruction Report

Summary

| | |
|-----------------------|--------------------------------|
| Report Creation Date | 2021-03-03 06:51 |
| GrainMapper3D Version | 2.3.0.3184 |
| Project File | E:\DCT\ET12-4_test.gm3d |
| Absorption File | ET12_4_ABS_110kV_le5_recon.txm |
| DCT File | ET12_4_DCT_110kV_13mm.txrm |
| Author | ZEISS |

Data

Crystal Structure

| | |
|-------------------|---|
| Structure Name | Titanium |
| Crystal System | Hexagonal (6/mmm) |
| Cell Length | $a = b = 0.295 \text{ nm}, c = 0.4686 \text{ nm}$ |
| Cell Angles | $\alpha = \beta = 90^\circ, \gamma = 120^\circ$ |
| Symmetry | P 63/m m c |
| Spacegroup Number | 194 |

Absorption Data

| | |
|----------------------|--|
| Absorption File Name | ET12_4_ABS_110kV_le5_recon.txm |
| Extent | 663.18 $\mu\text{m} \times 524.46 \mu\text{m} \times 395.88 \mu\text{m}$ |
| Voxels | 196 x 155 x 117 |
| Voxel Size | 3.3836 μm |

DCT Data

| | |
|-----------------------|----------------------------|
| DCT File Name | ET12_4_DCT_110kV_13mm.txrm |
| Scan Start Date | 2021-03-02 17:37 |
| Scan Stop Date | 2021-03-03 07:19 |
| Scan Duration | 05h 41m |
| Aperture | DCT aperture 250x750 |
| Objective | DCT 4X |
| Beam Stop | Unknown |
| Number of Images | 201 |
| Image Size | 1012 x 1012 |
| Horizontal DCT Offset | -0.027364 pixels |
| Vertical DCT Offset | 5.4556 pixels |
| Source-to-RA | 13.092 mm |
| Detector-to-RA | 13.001 mm |

Grain Reconstruction Data

| | |
|------------------|---|
| Extent | 665 $\mu\text{m} \times 525 \mu\text{m} \times 380 \mu\text{m}$ |
| Voxels | 133 x 105 x 76 |
| Voxel Size | 5 μm |
| Number of Grains | 1495 (+343 smaller than 10 Voxels) |

Recipes

Recipes Summary

| | |
|-------------------------|--|
| Data | ZEISS TXM/TXRM File Interface |
| Crystal Structure | Phase Definition |
| Absorption Crop | Absorption Crop |
| Absorption Segmentation | Automatic Threshold Segmentation |
| Detector Mask | Custom Beam Stop with Aperture |
| DCT Segmentation | DCT Laplacians of Gaussians |
| Calibration | Self Calibration |
| DCT Indexing | Fast Geometric Indexing (FGI) |
| Postprocessing | Define Grains |

Recipe Parameters

ZEISS TXM/TXRM File Interface

Data Files

| | |
|-----------------------|--|
| Absorption File (TXM) | Z:\STEVE\Proudhon\ET12_4\ET12_4_2021-03-02_165101\ABS_110kV_le5\ET12_4_ABS_110kV_le5_recon.txm |
| DCT File (TXRM) | Z:\STEVE\Proudhon\ET12_4\ET12_4_2021-03-02_165101\DCT_110kV_13mm\ET12_4_DCT_110kV_13mm.txrm |

Advanced Absorption Data Import Options

| | |
|-----------------------------|---------|
| Aperture Precrop Vertical | True |
| Sample Height | 1600 µm |
| Aperture Precrop Horizontal | True |
| Sample Width | 1600 µm |
| Sample Length | 1600 µm |

Advanced DCT Import Options

| | |
|-------------------------------|-------|
| Apply Reference | True |
| Median Fluctuation Correction | True |
| Rolling Median Correction | 11 |
| Background Smoothening | 11 |
| Hotpixel Correction | 60000 |

Phase Definition

Crystal Structure

Crystal Structure

| | | |
|--------------|--------|----------|
| HKL Families | {002} | Titanium |
| | {101} | Titanium |
| | {2-10} | Titanium |
| | {2-12} | Titanium |

Absorption Crop

Crop Region

| | | | | |
|----------------|------|------------|------|-----------|
| ROI Definition | XMin | -338.44 µm | XMax | 325.98 µm |
| | YMin | -266.29 µm | YMax | 255.48 µm |
| | ZMin | -198.47 µm | ZMax | 196.49 µm |

Automatic Threshold Segmentation

Custom Beam Stop with Aperture

Detector Crop Region

| | | | | |
|-----------|------|------------|------|-----------|
| Beam Stop | XMin | -1565.6 µm | XMax | 1616.2 µm |
| | YMin | -1565.6 µm | YMax | 1672.3 µm |
| Aperture | XMin | -1040 µm | XMax | 1090.5 µm |
| | YMin | -238.13 µm | YMax | 507.58 µm |

DCT Laplacians of Gaussians

Parameters

| | |
|------------|------|
| Background | 1.5 |
| Sigma | 1.25 |
| Percent | 18 % |

Spot Filter

| | |
|-----------|--------------|
| Spot Size | >= 25 Pixels |
|-----------|--------------|

Self Calibration

Calibration

Instrumental Parameters

Fast Geometric Indexing (FGI)

DCT Indexing Parameters

| | |
|---------------|---|
| Maximum Level | 0 |
|---------------|---|

Region of Interest

| | | | | |
|----------------|------------|------------|------|-----------|
| ROI Definition | XMin | -338.36 µm | XMax | 324.82 µm |
| | YMin | -267.3 µm | YMax | 257.15 µm |
| | ZMin | -189.98 µm | ZMax | 187.67 µm |
| | Resolution | 5 µm | | |

Completeness Tolerances

| | |
|-----------------------|------|
| Minimum Completeness | 45 % |
| Trust Completeness | 85 % |
| Completeness Drop-off | 2 % |

Define Grains

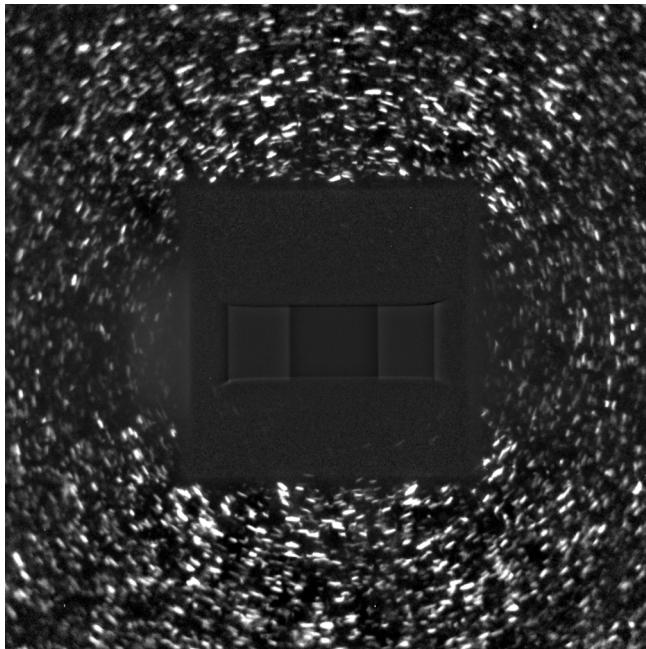
Cleanup Parameters

| | |
|--------------------------|-------|
| Misorientation threshold | 0.5 ° |
| Update Completeness | True |

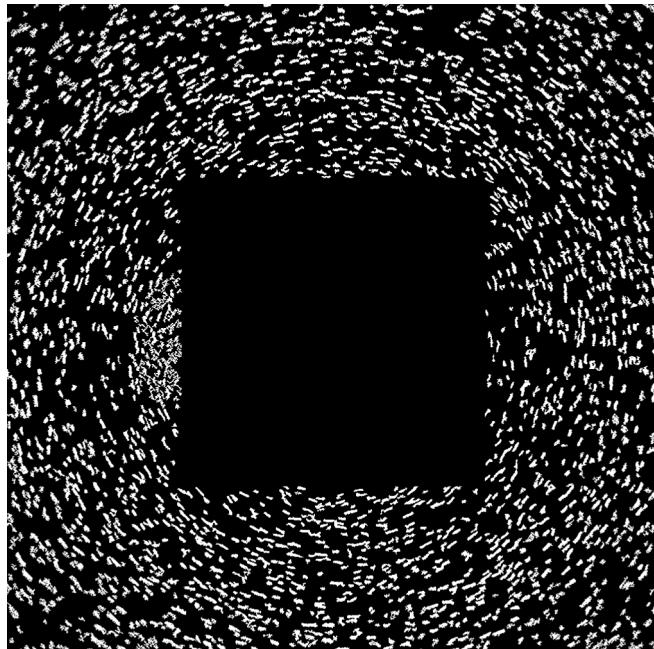
DCT Data

$\omega = -180^\circ$

Raw DCT Data

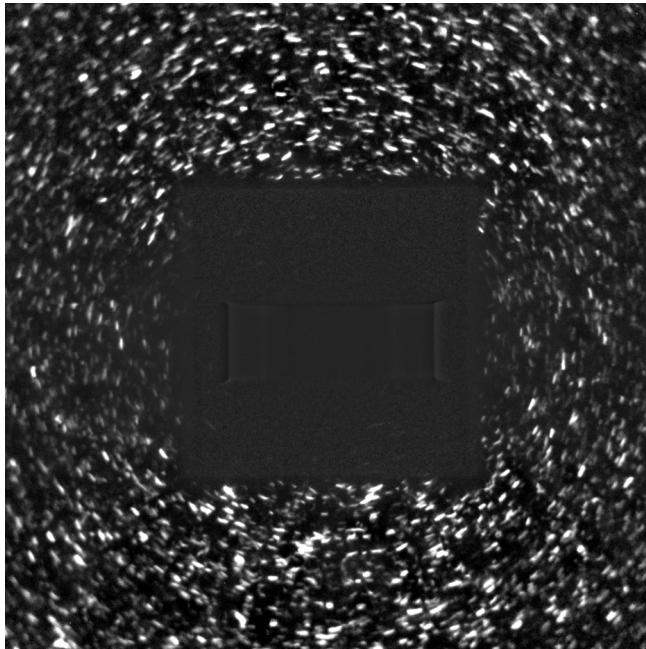


Segmented DCT Data

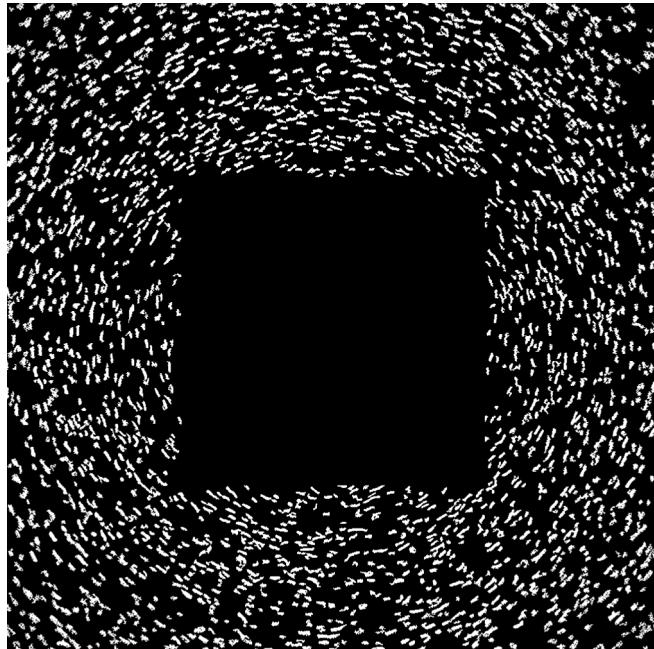


$\omega = -108^\circ$

Raw DCT Data

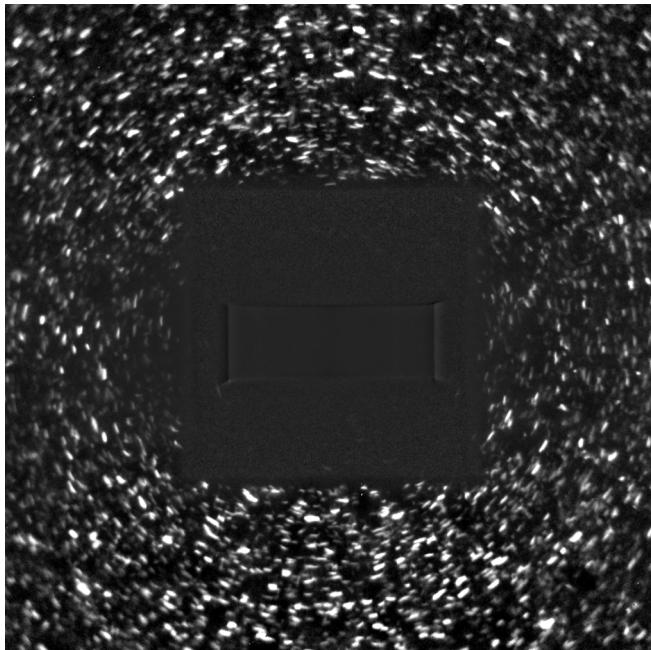


Segmented DCT Data

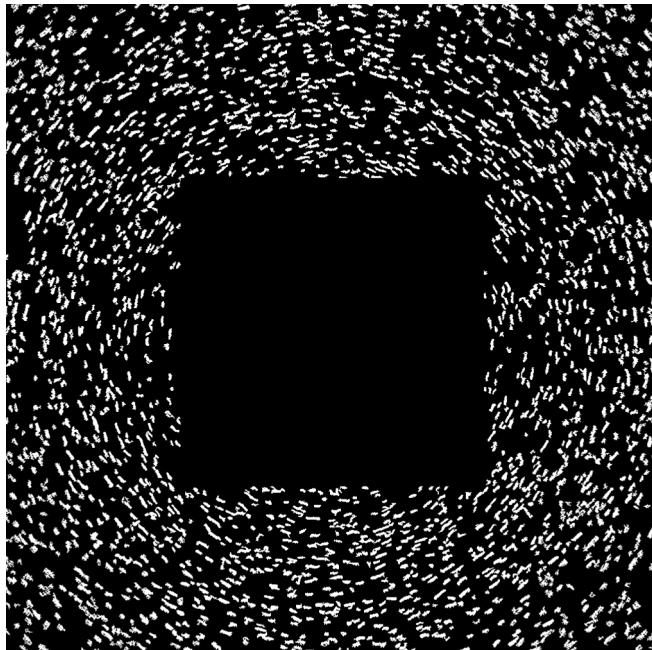


$\omega = -36.004^\circ$

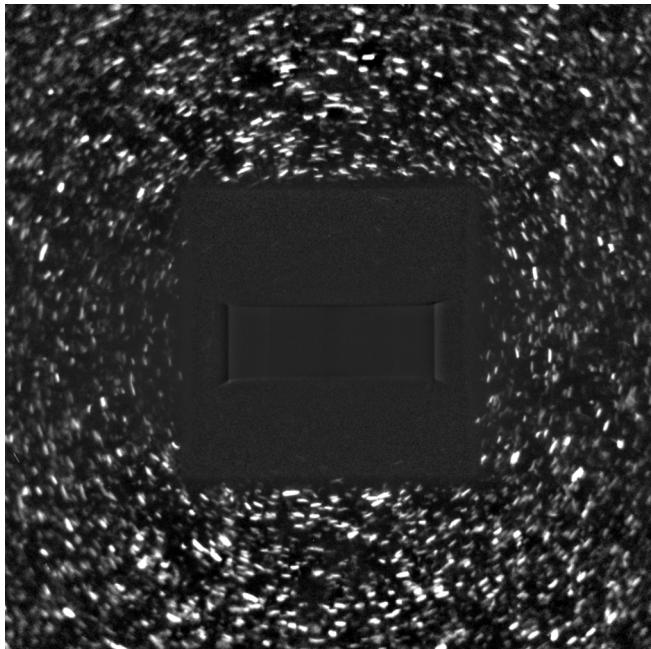
Raw DCT Data



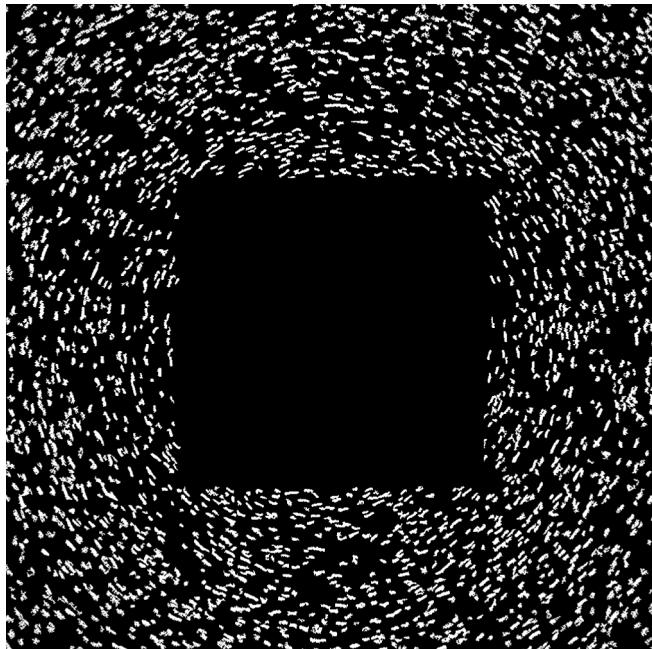
Segmented DCT Data

 $\omega = 35.996^\circ$

Raw DCT Data

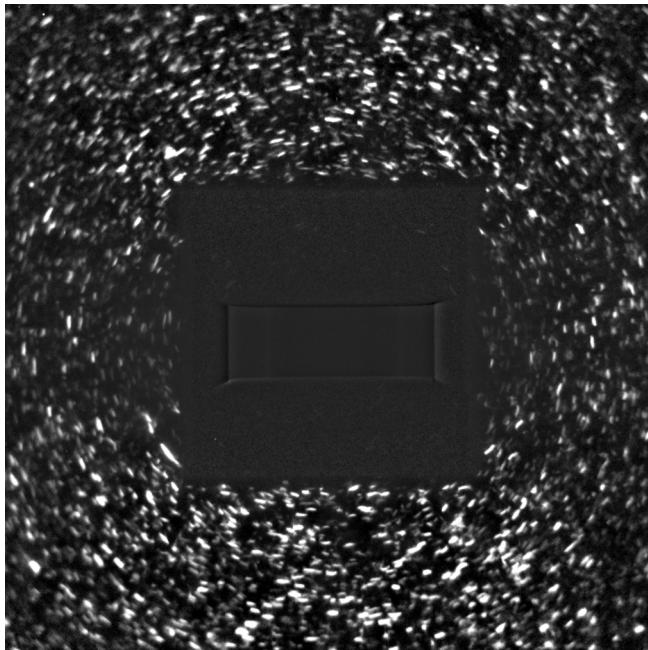


Segmented DCT Data

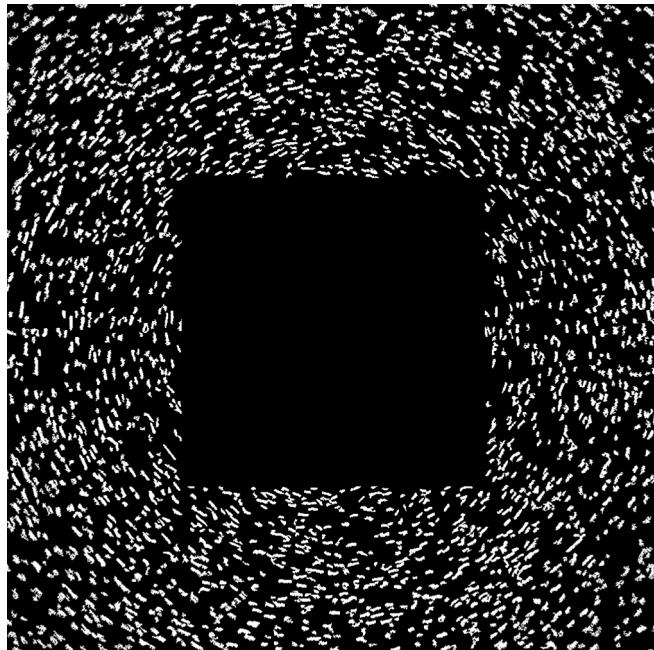


$\omega = 108^\circ$

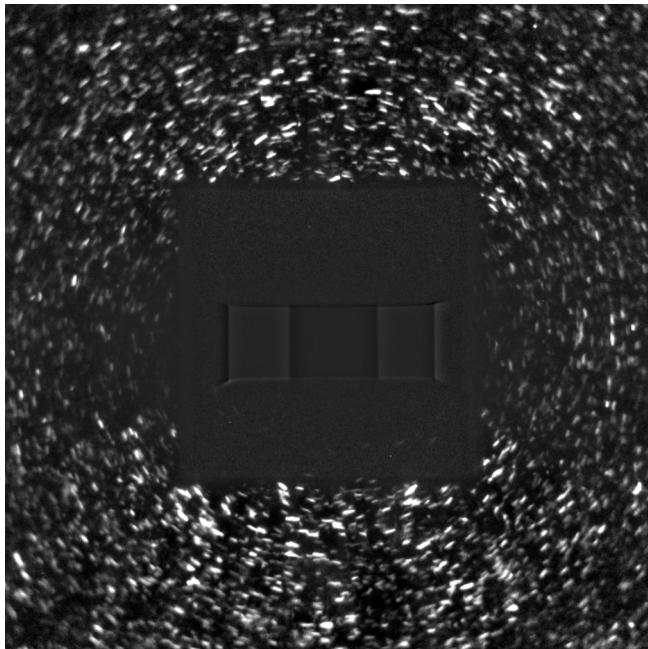
Raw DCT Data



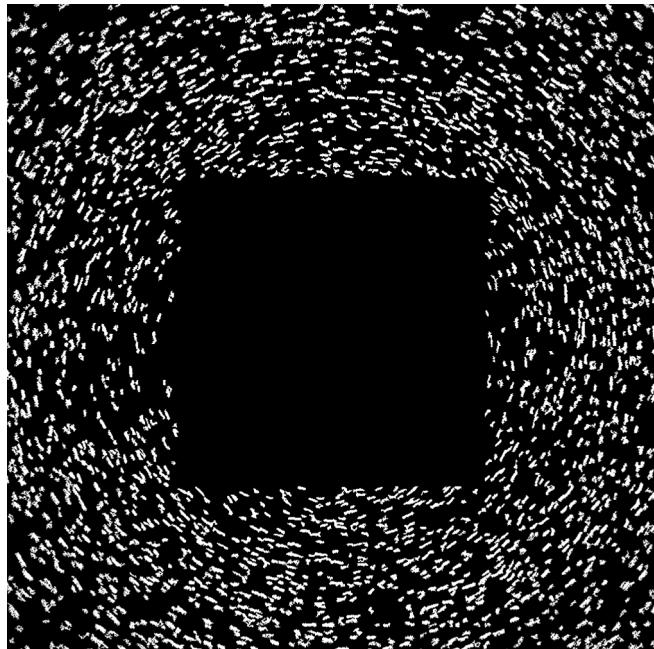
Segmented DCT Data

 $\omega = 180^\circ$

Raw DCT Data



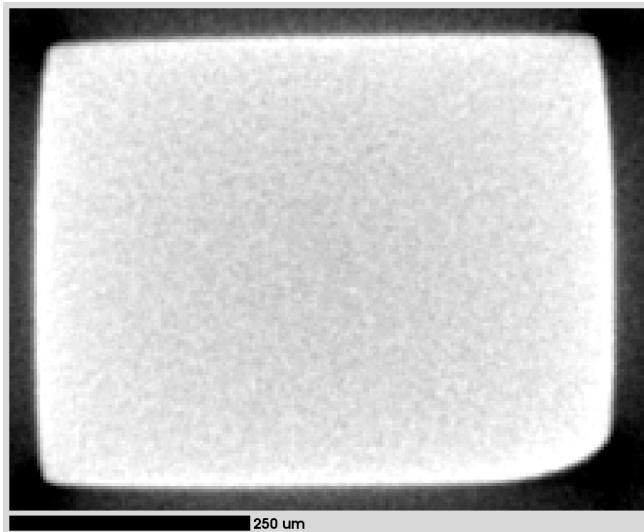
Segmented DCT Data



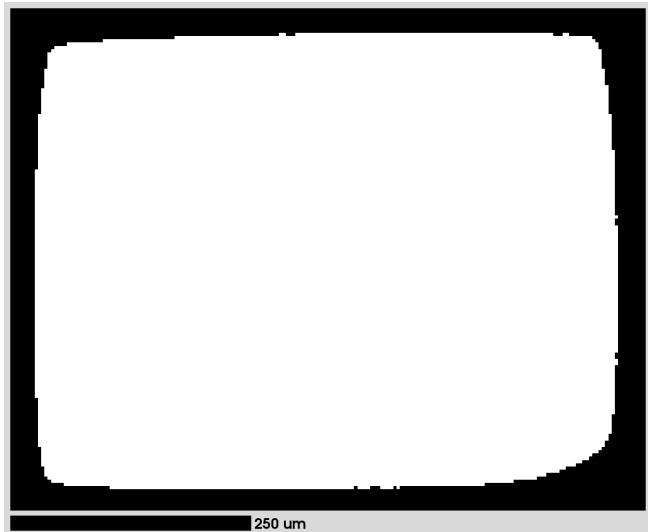
Absorption Data

Top View, Slice 57 of 116

Raw Absorption Data

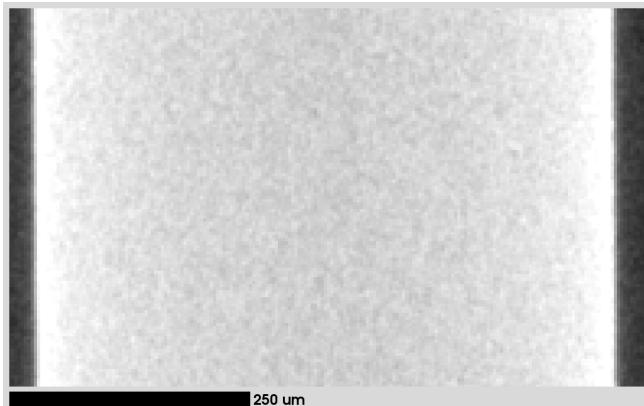


Segmented Absorption Data



Front View, Slice 76 of 154

Raw Absorption Data

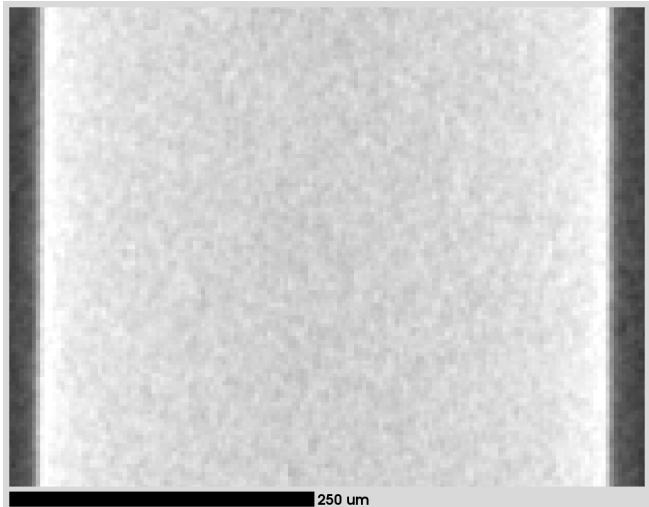


Segmented Absorption Data



Side View, Slice 97 of 195

Raw Absorption Data



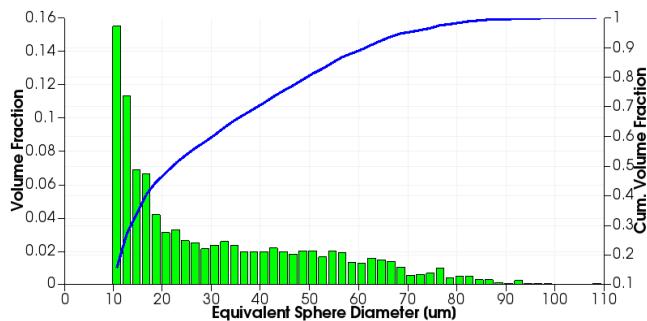
Segmented Absorption Data



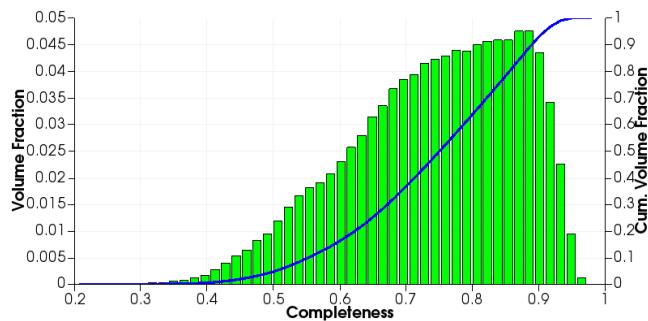
Grain Reconstruction

Grain Statistics

Grain Size Distribution

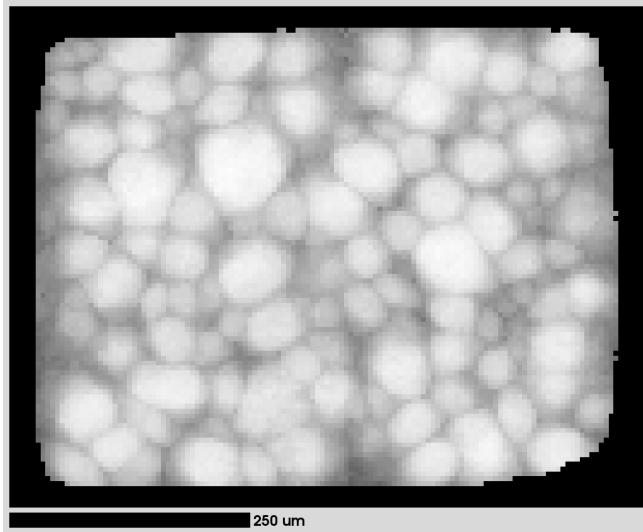


Completeness Distribution

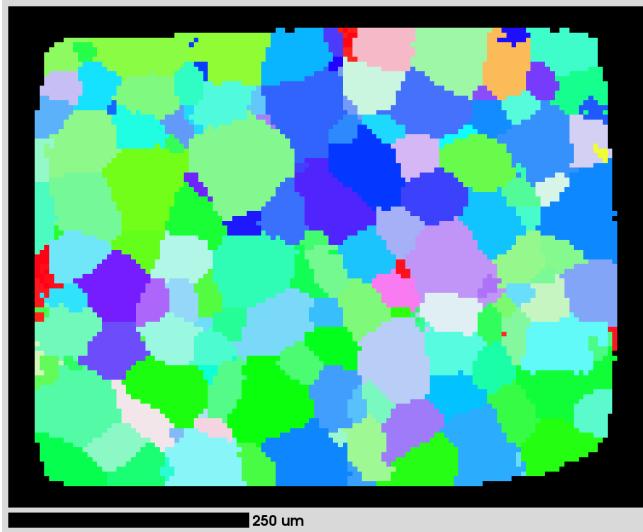


Top View, Slice 37 of 75

Completeness Map

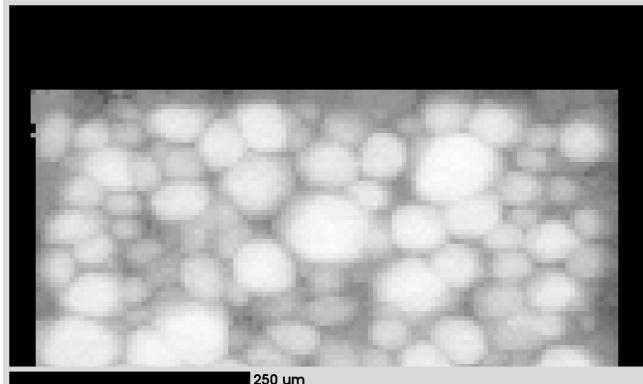


IPF (+Z) Map

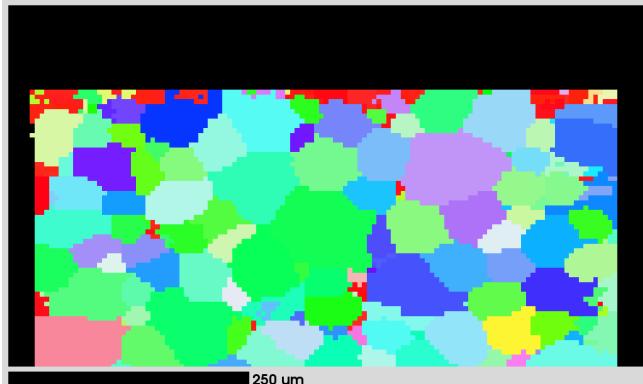


Front View, Slice 51 of 104

Completeness Map

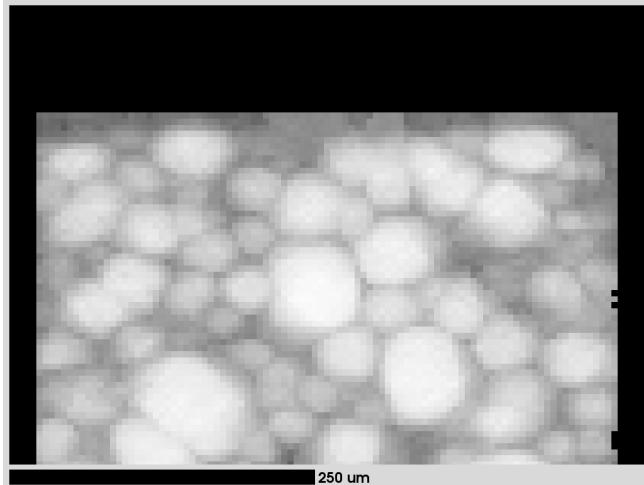


IPF (+Z) Map

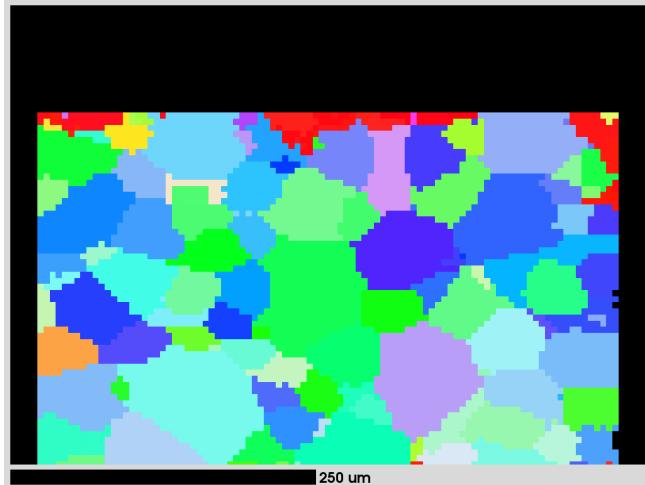


Side View, Slice 65 of 132

Completeness Map



IPF (+Z) Map



Titanium IPF (+Z)

