

# GrainMapper3D™

## Reconstruction Report

### Summary

Report Creation Date	2021-03-08 05:53
GrainMapper3D Version	2.3.0.3184
Project File	E:\DCT\ET12-4_03.gm3d
Absorption File	ET12_4_ABS_110kV_le5_p175mu_recon.txm
DCT File	ET12_4_DCT_110kV_13mm_p175mu.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_p175mu_recon.txm
Extent	644.17 $\mu\text{m} \times 522.76 \mu\text{m} \times 408.09 \mu\text{m}$
Voxels	191 x 155 x 121
Voxel Size	3.3726 $\mu\text{m}$

### DCT Data

DCT File Name	ET12_4_DCT_110kV_13mm_p175mu.txrm
Scan Start Date	2021-03-07 00:37
Scan Stop Date	2021-03-07 14:18
Scan Duration	05h 40m
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	13.018 mm
Detector-to-RA	13 mm

### Grain Reconstruction Data

Extent	644 $\mu\text{m} \times 524 \mu\text{m} \times 408 \mu\text{m}$
Voxels	161 x 131 x 102
Voxel Size	4 $\mu\text{m}$
Number of Grains	1679 (+279 smaller than 10 Voxels)

# Recipes

## Recipes Summary

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

## Recipe Parameters

### ZEISS TXM/TXRM File Interface

#### Data Files

Absorption File (TXM)	Z:\STEVE\Proudhon\ET12_4\ET12_4_2021-03-05_175527\ABS_110kV_le5_p175mu\ET12_4_ABS_110kV_le5_p175mu_recon.txm
DCT File (TXRM)	Z:\STEVE\Proudhon\ET12_4\ET12_4_2021-03-05_175527\DCT_110kV_13mm_p175mu\ET12_4_DCT_110kV_13mm_p175mu.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	-344.01 µm	XMax	300.68 µm
	YMin	-264.96 µm	YMax	257.63 µm
	ZMin	-202.36 µm	ZMax	205.73 µm

## Automatic Threshold Segmentation

### Custom Beam Stop with Aperture

#### Detector Crop Region

Beam Stop	XMin	-1628.3 µm	XMax	1650.7 µm
	YMin	-1549.9 µm	YMax	1717.9 µm
Aperture	XMin	-1042.5 µm	XMax	1115.3 µm
	YMin	-360.57 µm	YMax	343.77 µm

## DCT Laplacians of Gaussians

### Parameters

Background	1.5
Sigma	1.25
Percent	18 %

### Spot Filter

Spot Size	>= 25 Pixels
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## Self Calibration

### Calibration

#### Instrumental Parameters

## Fast Geometric Indexing (FGI)

### DCT Indexing Parameters

Maximum Level	0
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### Region of Interest

ROI Definition	XMin	-344.01 µm	XMax	300.16 µm
	YMin	-266.44 µm	YMax	256.32 µm
	ZMin	-202.36 µm	ZMax	205.73 µm
	Resolution		4 µm	

### Completeness Tolerances

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

## Define Grains

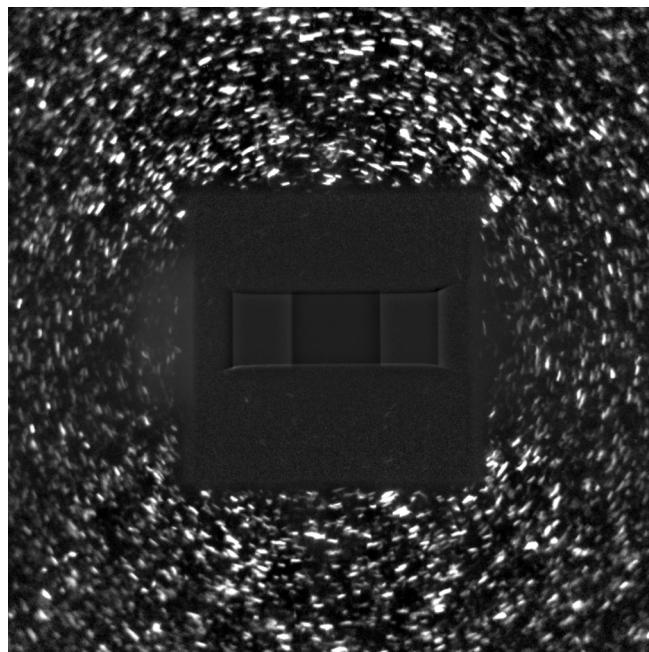
### Cleanup Parameters

Misorientation threshold	0.5 °
Update Completeness	True

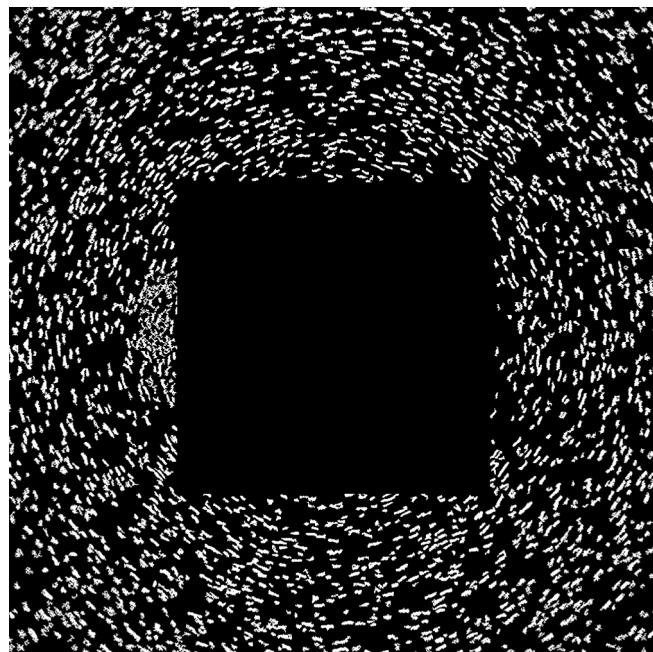
## DCT Data

$\omega = -180^\circ$

Raw DCT Data

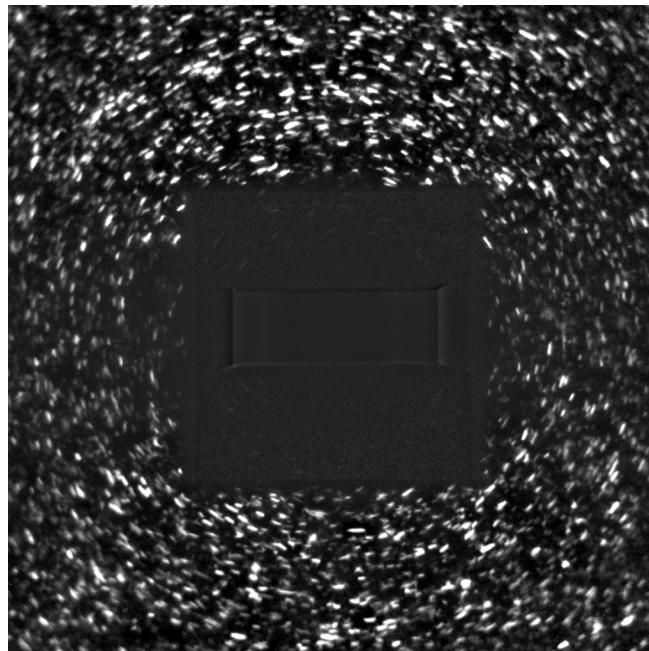


Segmented DCT Data

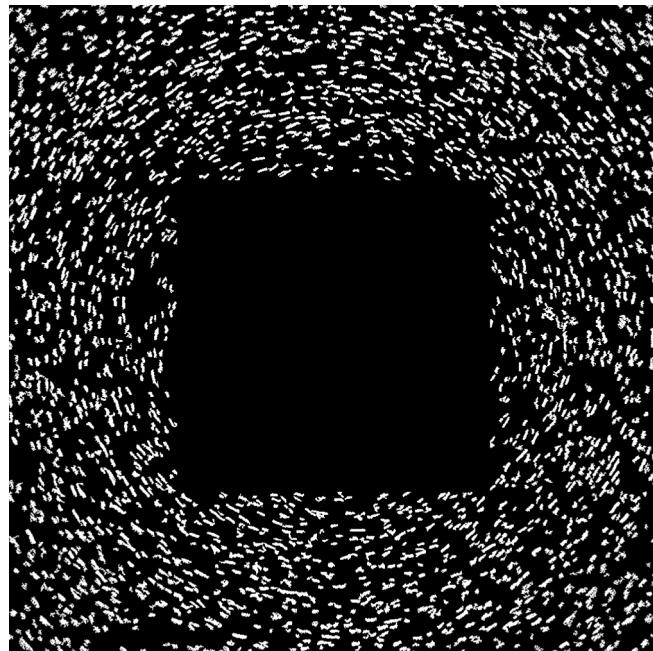


$\omega = -108^\circ$

Raw DCT Data

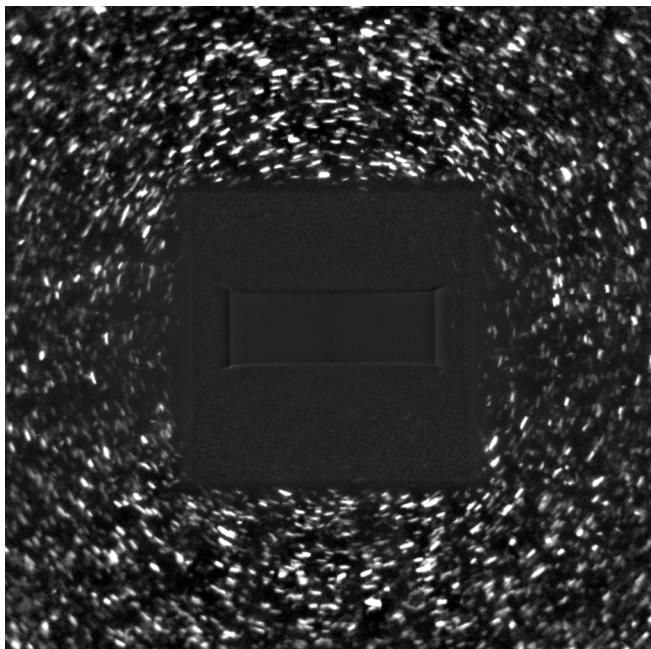


Segmented DCT Data

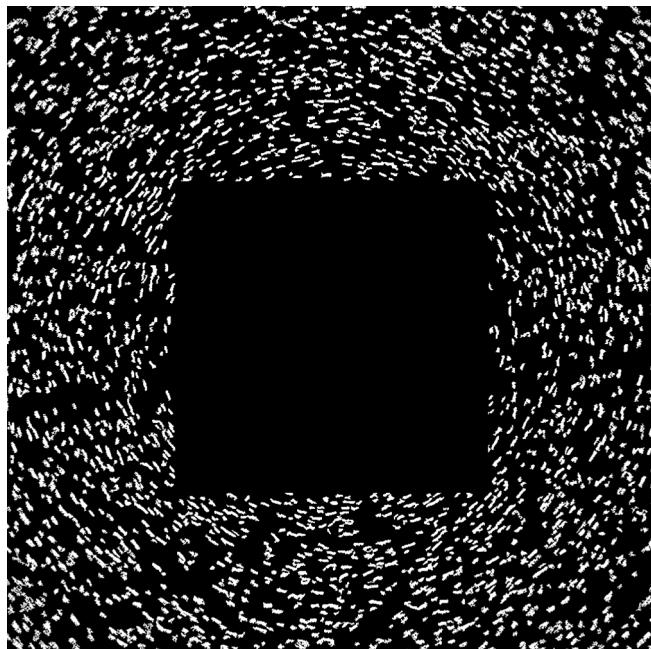


$\omega = -36.003^\circ$ 

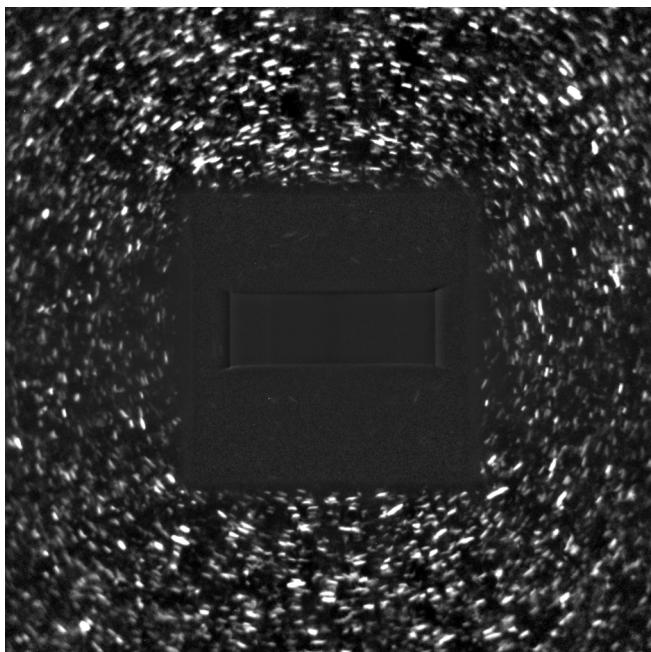
Raw DCT Data



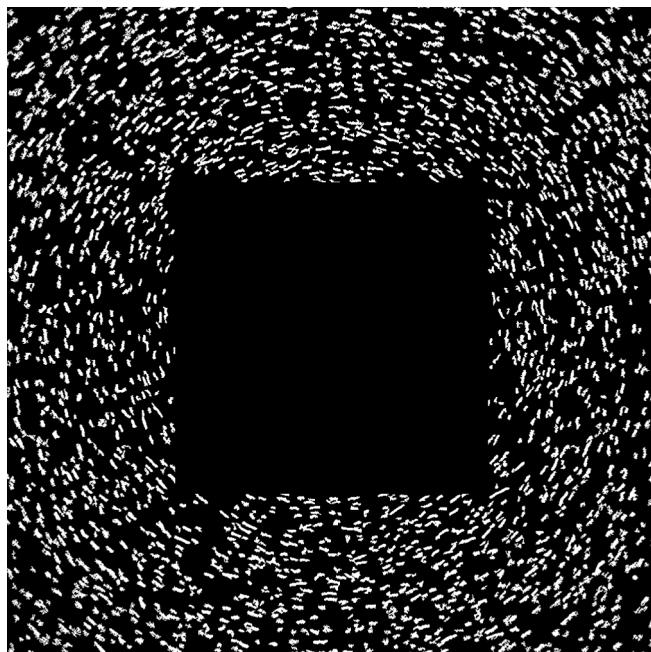
Segmented DCT Data

 $\omega = 35.998^\circ$ 

Raw DCT Data

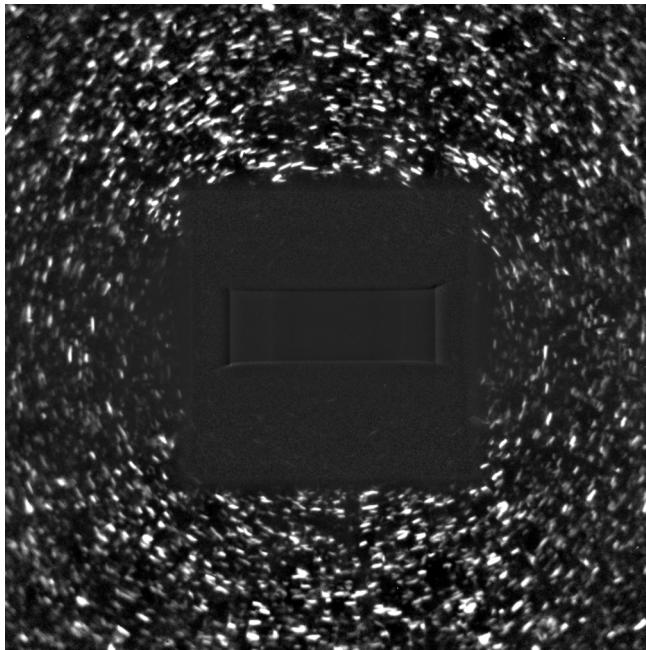


Segmented DCT Data

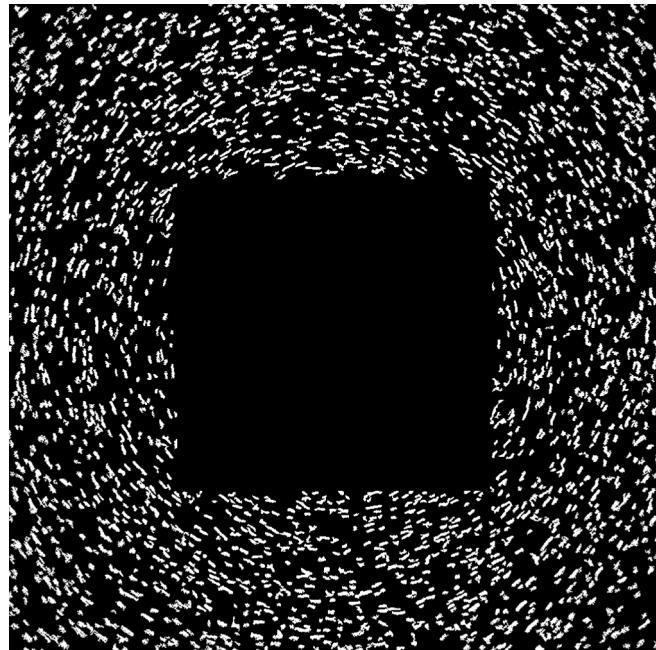


$\omega = 108^\circ$

Raw DCT Data

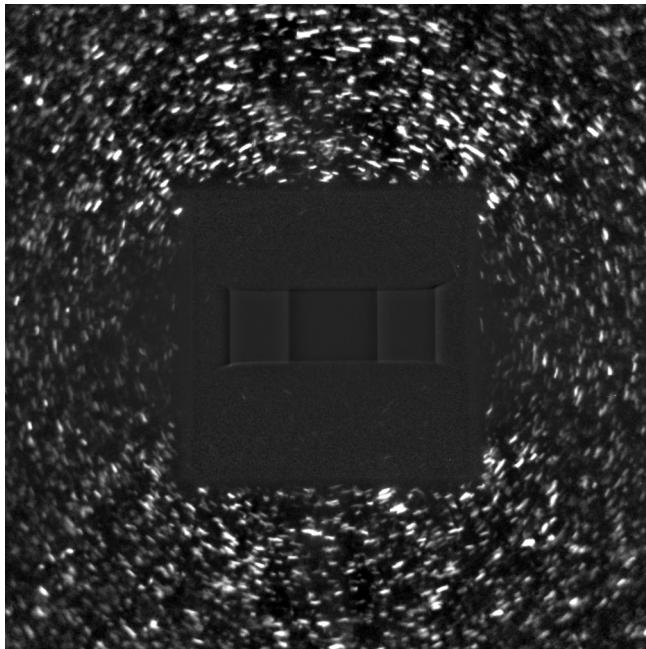


Segmented DCT Data

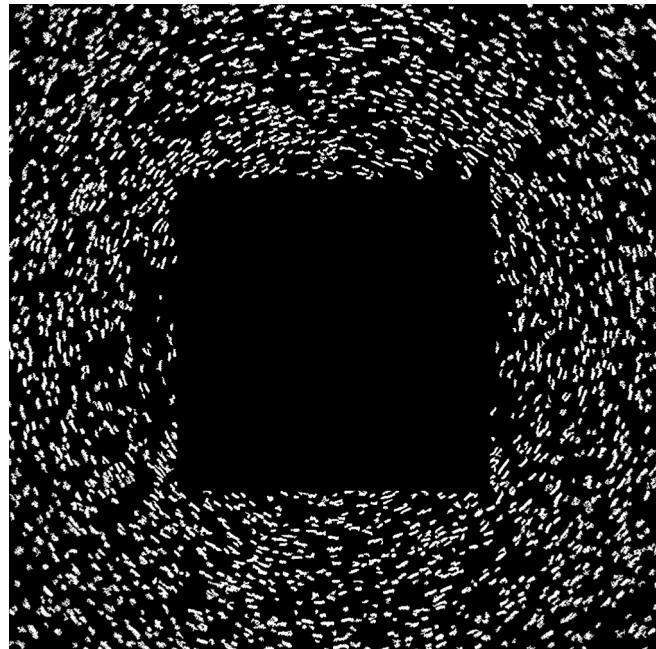


$\omega = 180^\circ$

Raw DCT Data



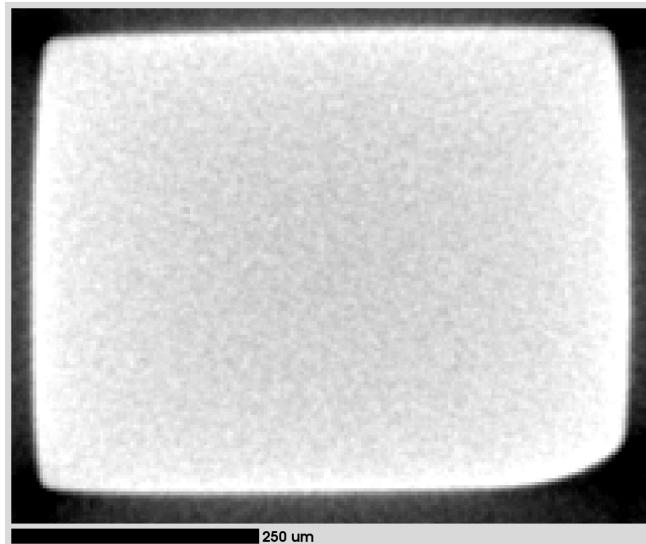
Segmented DCT Data



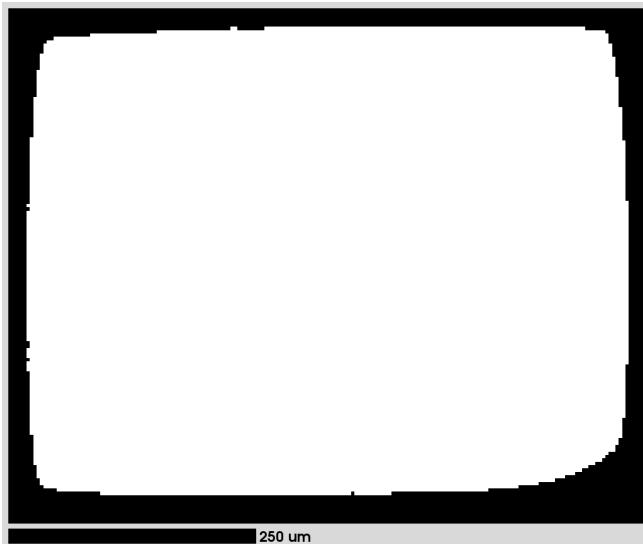
## Absorption Data

Top View, Slice 59 of 120

Raw Absorption Data

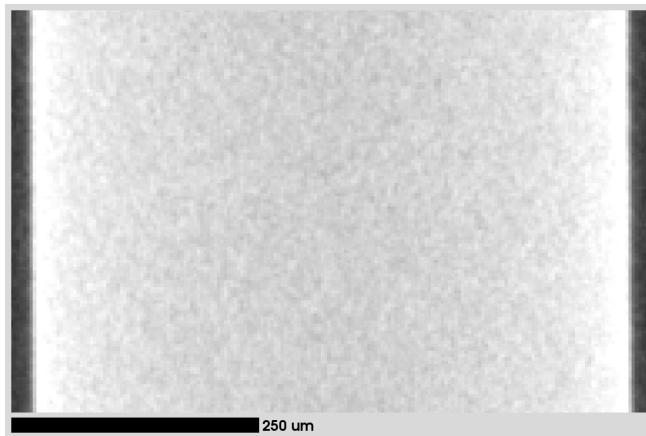


Segmented Absorption Data

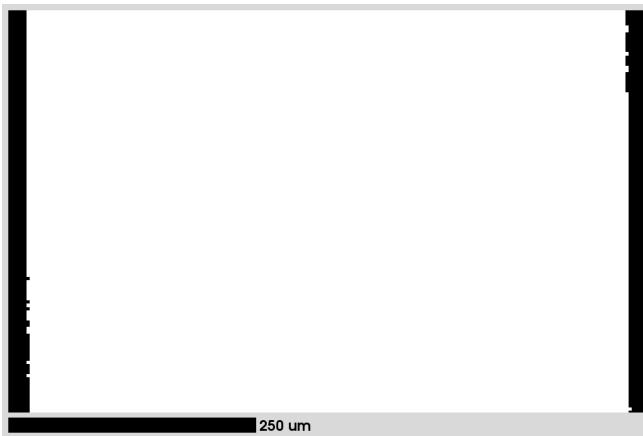


Front View, Slice 76 of 154

Raw Absorption Data

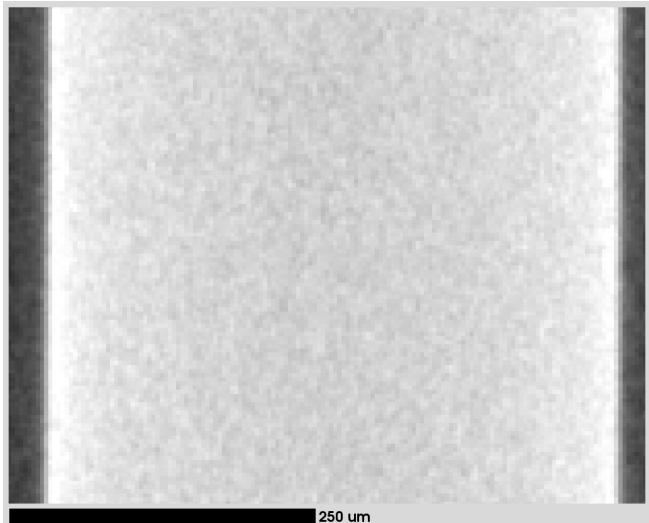


Segmented Absorption Data



### Side View, Slice 94 of 190

Raw Absorption Data



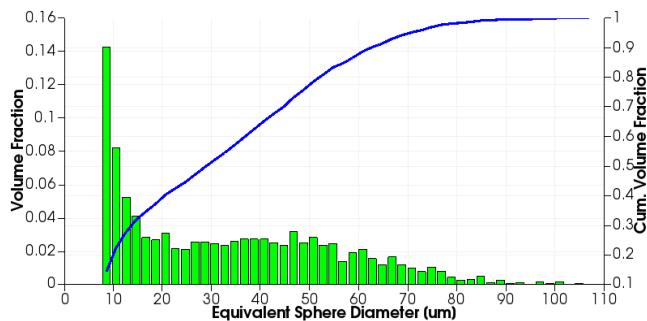
Segmented Absorption Data



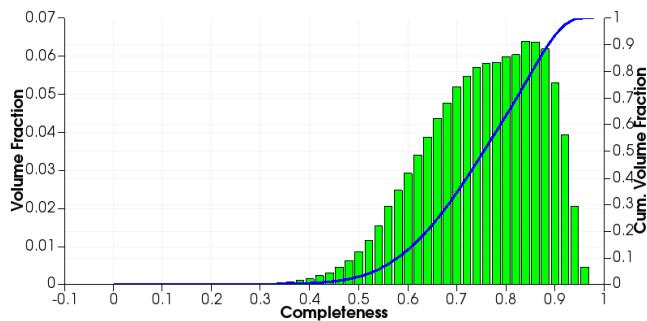
# Grain Reconstruction

## Grain Statistics

### Grain Size Distribution

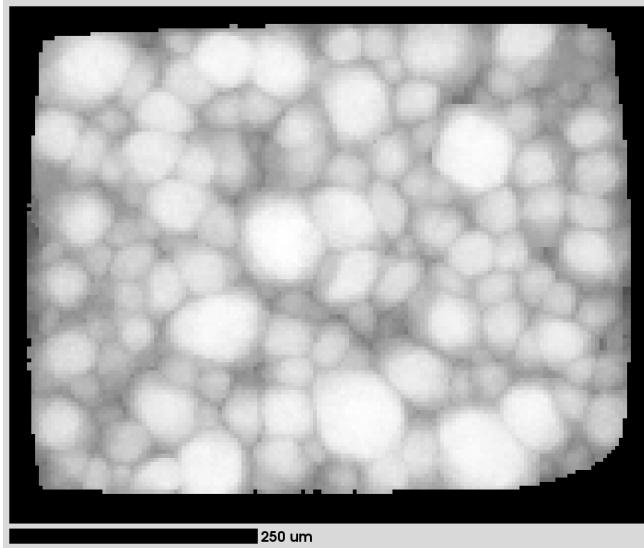


### Completeness Distribution

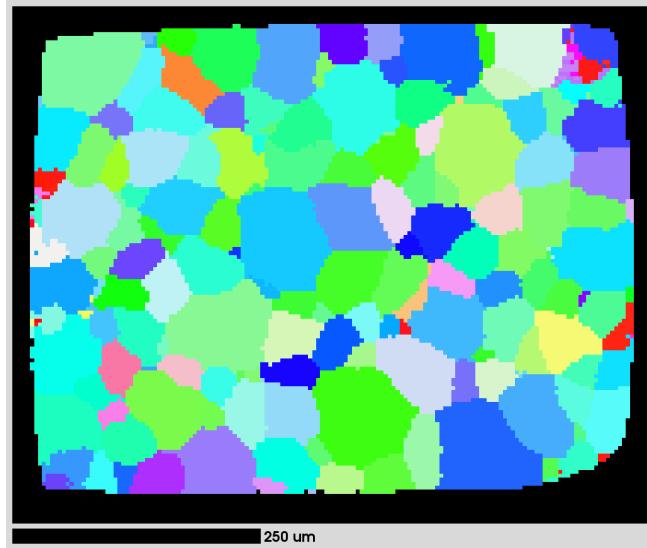


## Top View, Slice 50 of 101

### Completeness Map

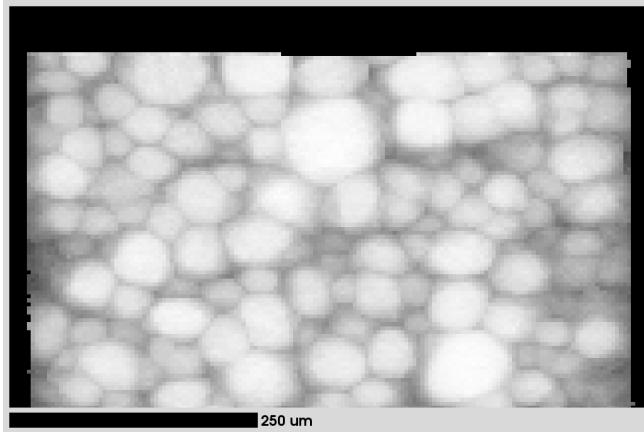


### IPF (+Z) Map

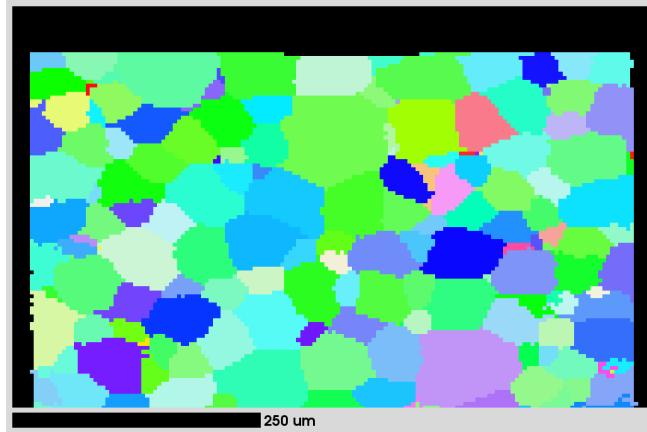


## Front View, Slice 64 of 130

### Completeness Map

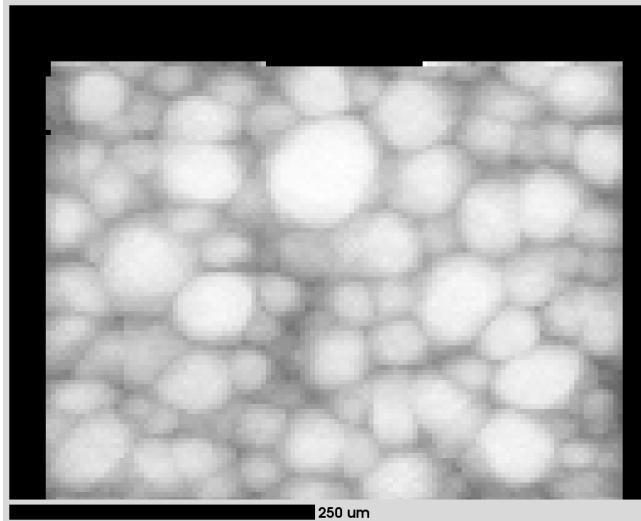


### IPF (+Z) Map

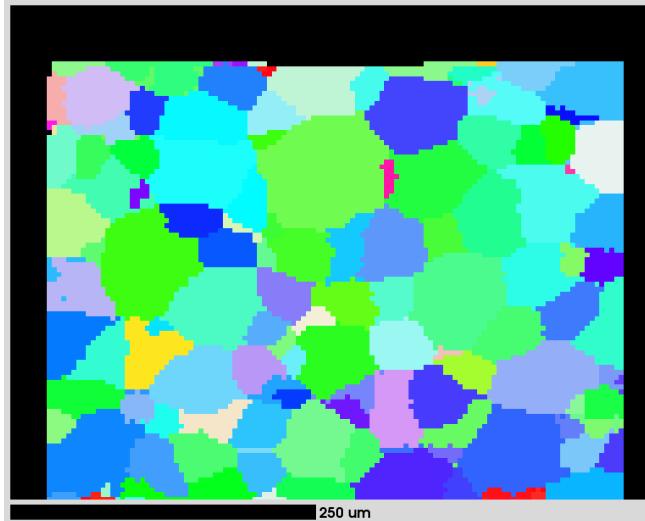


## Side View, Slice 79 of 160

Completeness Map



IPF (+Z) Map



Titanium IPF (+Z)

