

# GrainMapper3D™

## Reconstruction Report

### Summary

Report Creation Date	2021-03-07 23:48
GrainMapper3D Version	2.3.0.3184
Project File	E:\DCT\ET12-4_01.gm3d
Absorption File	ET12_4_ABS_110kV_le5_m525mu_recon.txm
DCT File	ET12_4_DCT_110kV_13mm_m525mu.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_m525mu_recon.txm
Extent	644.35 $\mu\text{m} \times 519.53 \mu\text{m} \times 408.2 \mu\text{m}$
Voxels	191 x 154 x 121
Voxel Size	3.3736 $\mu\text{m}$

### DCT Data

DCT File Name	ET12_4_DCT_110kV_13mm_m525mu.txrm
Scan Start Date	2021-03-05 19:36
Scan Stop Date	2021-03-06 09:16
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	13.022 mm
Detector-to-RA	13 mm

### Grain Reconstruction Data

Extent	644 $\mu\text{m} \times 520 \mu\text{m} \times 408 \mu\text{m}$
Voxels	161 x 130 x 102
Voxel Size	4 $\mu\text{m}$
Number of Grains	1724 (+312 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_m525mu\ET12_4_ABS_110kV_le5_m525mu_recon.txm
DCT File (TXRM)	Z:\STEVE\Proudhon\ET12_4\ET12_4_2021-03-05_175527\DCT_110kV_13mm_m525mu\ET12_4_DCT_110kV_13mm_m525mu.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	-338.2 µm	XMax	308.65 µm
	YMin	-261.1 µm	YMax	259.67 µm
	ZMin	-202.41 µm	ZMax	205.79 µm

## Automatic Threshold Segmentation

### Custom Beam Stop with Aperture

#### Detector Crop Region

Beam Stop	XMin	-1594.7 µm	XMax	1667.7 µm
	YMin	-1555.4 µm	YMax	1729.4 µm
Aperture	XMin	-1042.5 µm	XMax	1115.5 µm
	YMin	-371.83 µm	YMax	343.76 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	-337.36 µm	XMax	306.99 µm
	YMin	-259.76 µm	YMax	259.76 µm
	ZMin	-202.41 µm	ZMax	205.79 µm
	Resolution		4 µm	

### Completeness Tolerances

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

## Define Grains

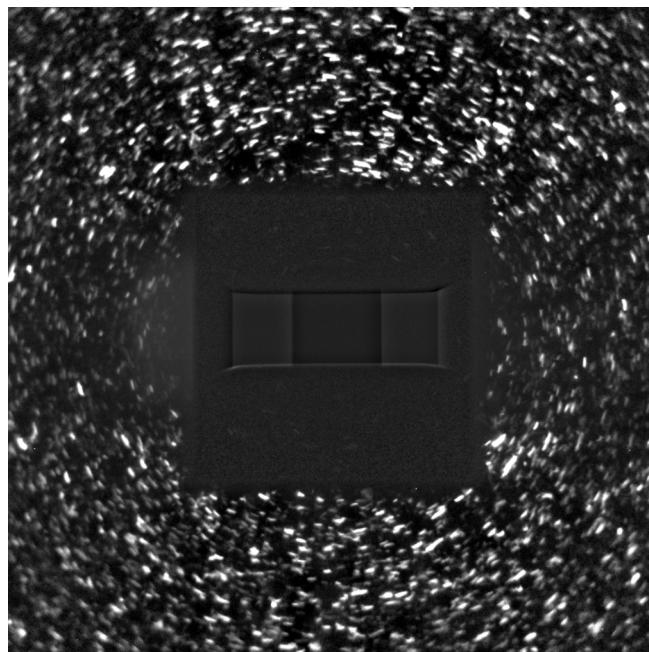
### Cleanup Parameters

Misorientation threshold	0.5 °
Update Completeness	True

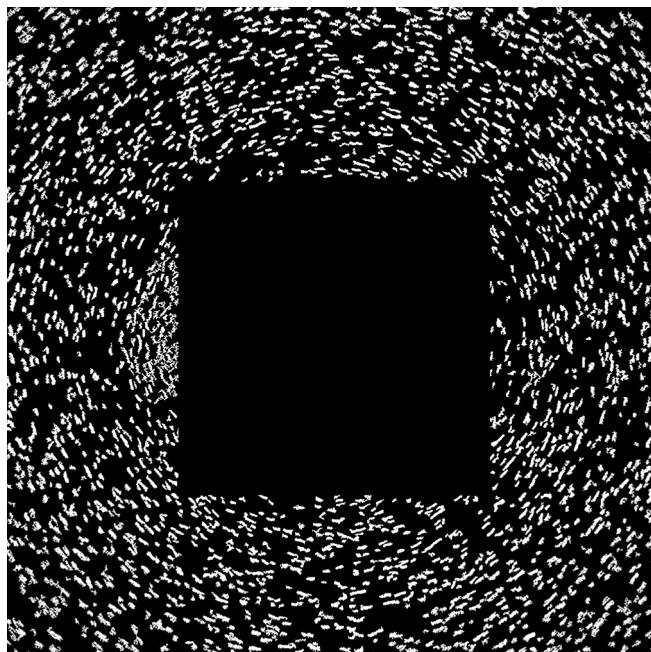
## DCT Data

$\omega = -180^\circ$

Raw DCT Data

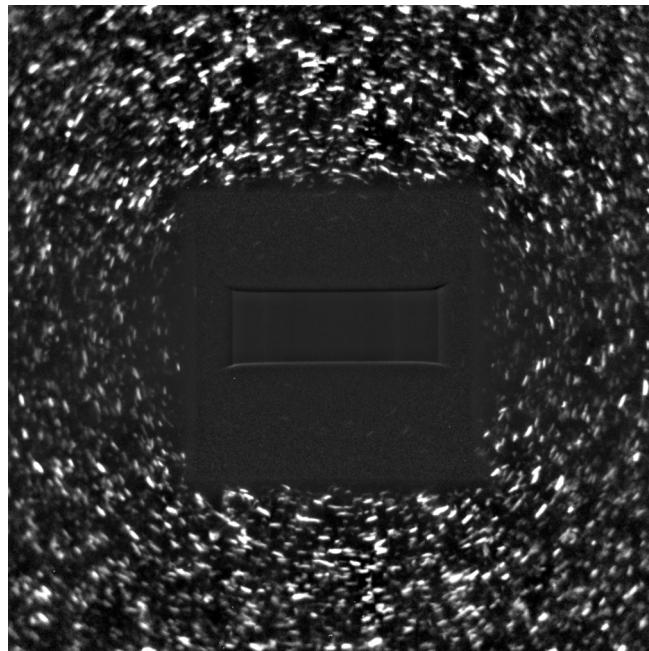


Segmented DCT Data

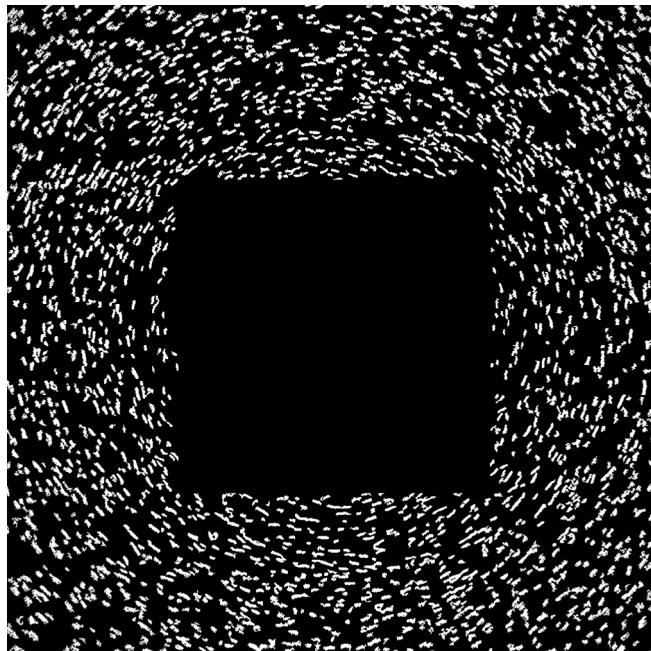


$\omega = -108^\circ$

Raw DCT Data

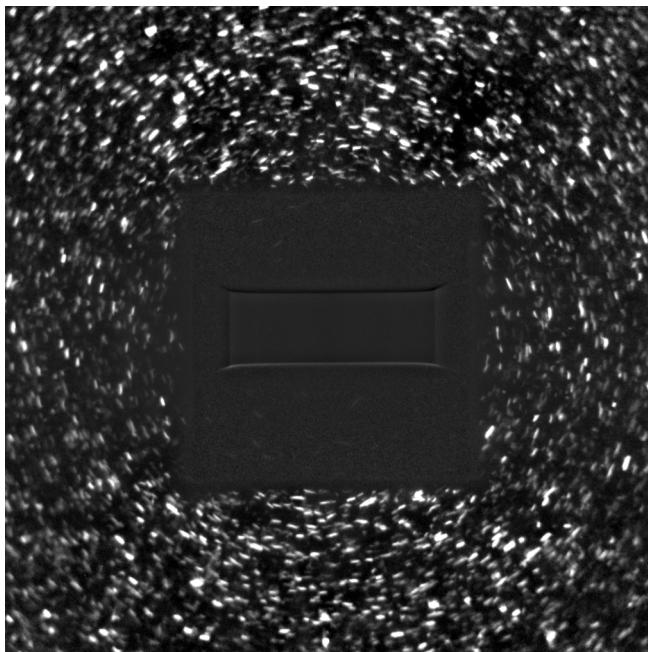


Segmented DCT Data

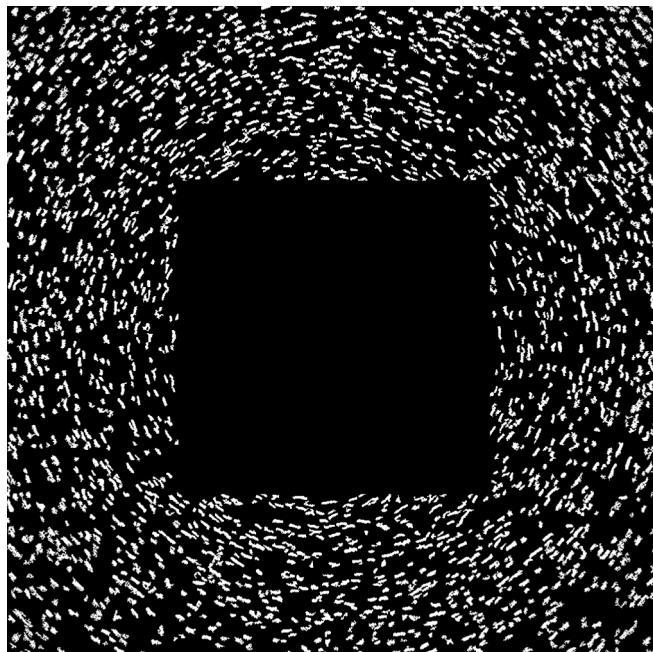


$\omega = -36.004^\circ$ 

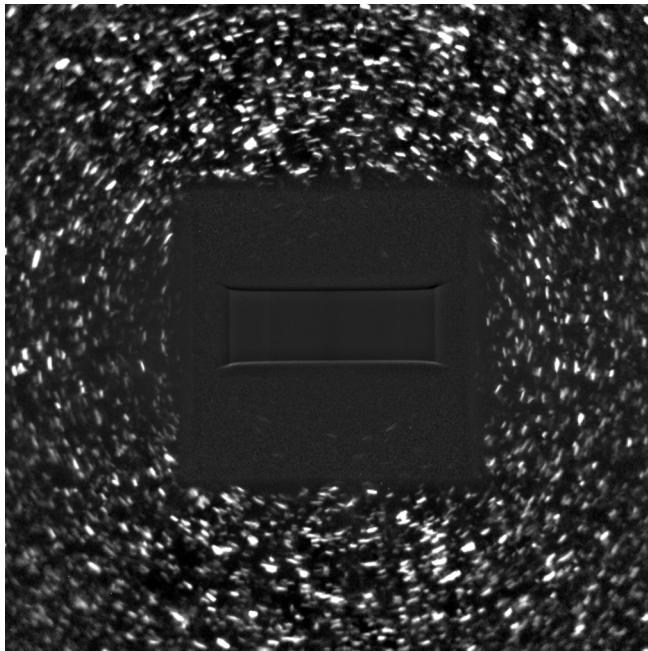
Raw DCT Data



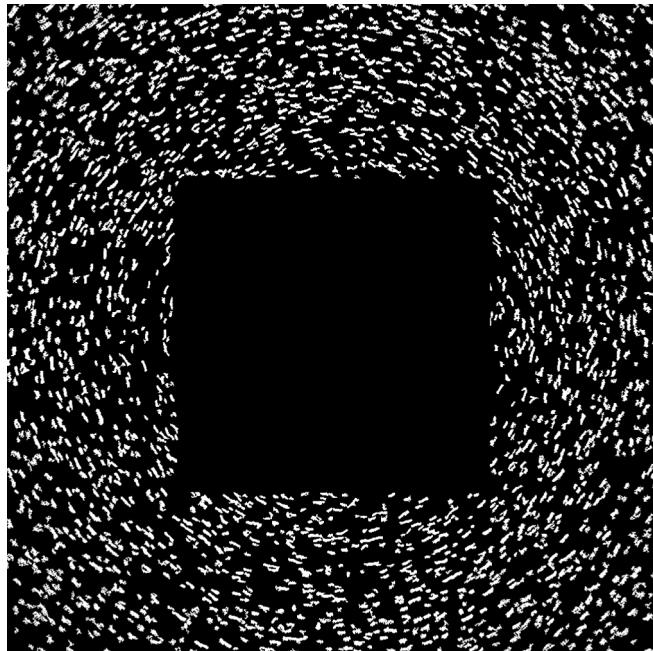
Segmented DCT Data

 $\omega = 35.996^\circ$ 

Raw DCT Data

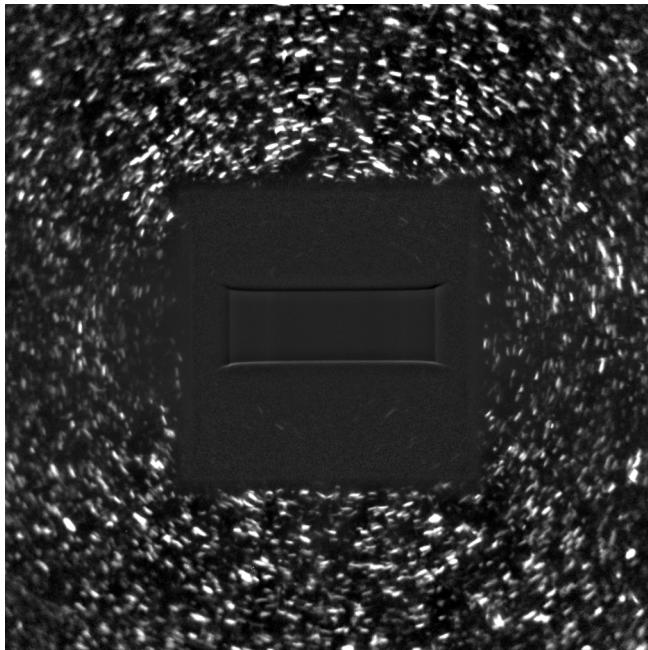


Segmented DCT Data

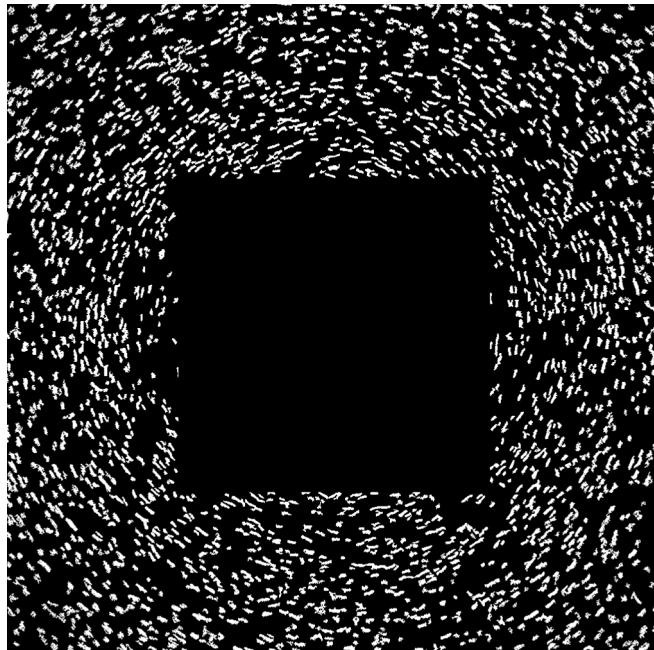


$\omega = 108^\circ$ 

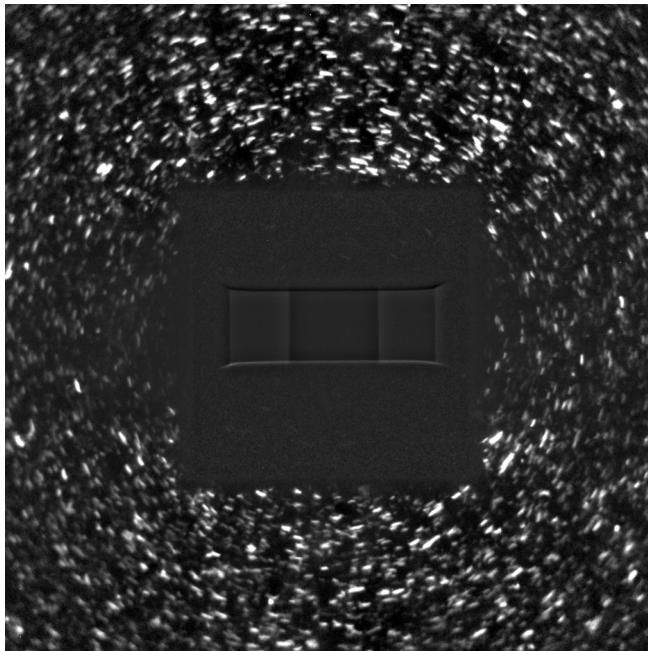
Raw DCT Data



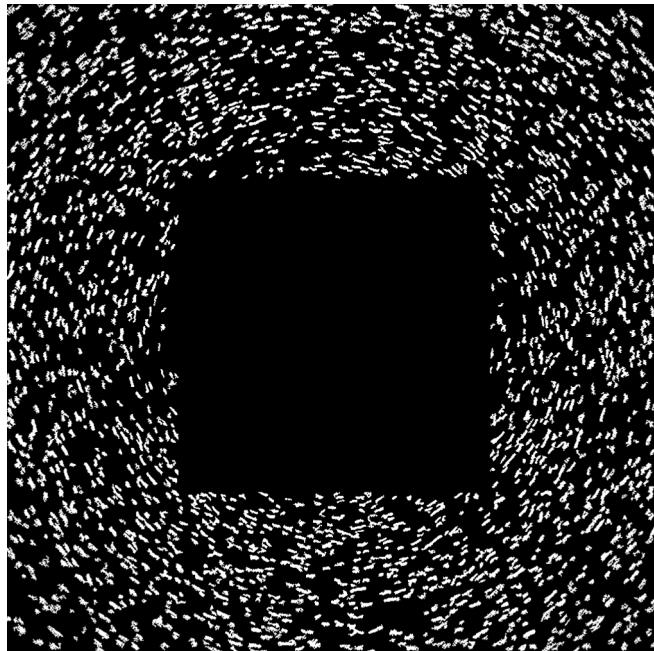
Segmented DCT Data

 $\omega = 180^\circ$ 

Raw DCT Data



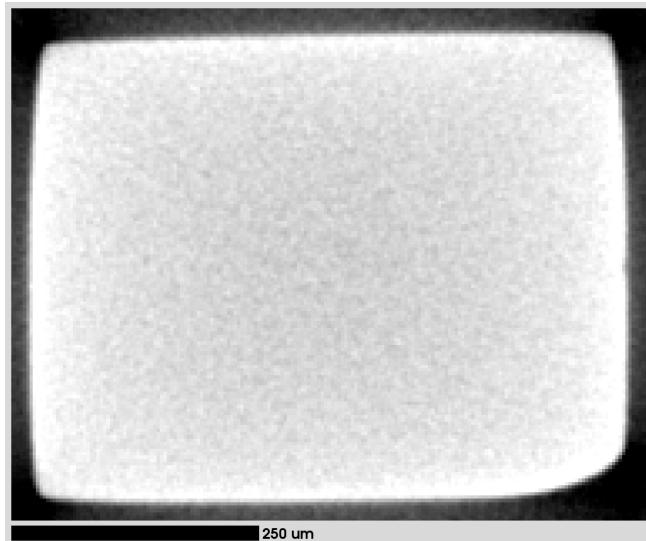
Segmented DCT Data



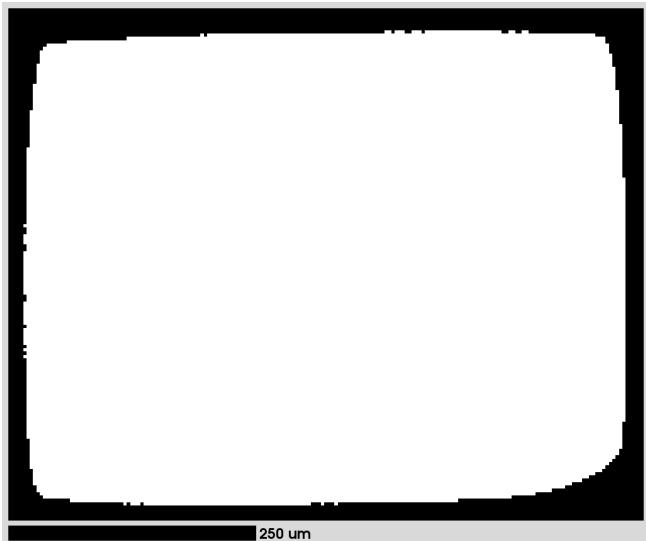
## Absorption Data

Top View, Slice 59 of 120

Raw Absorption Data

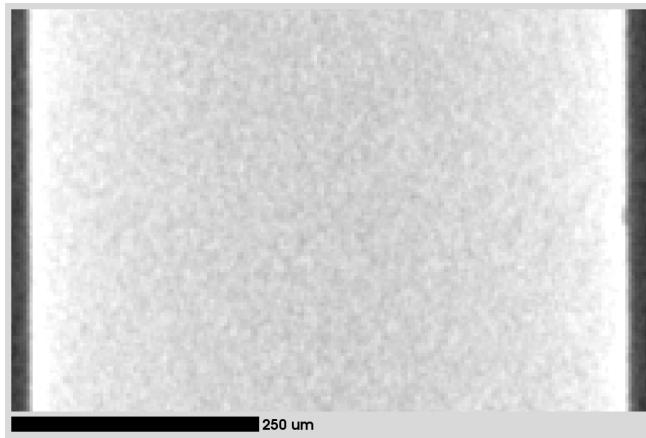


Segmented Absorption Data

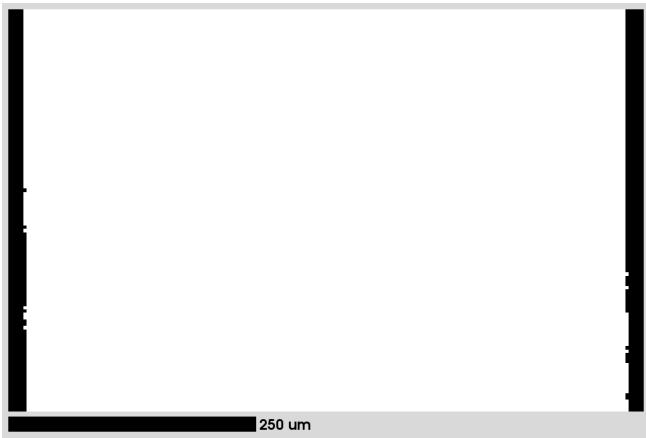


Front View, Slice 76 of 153

Raw Absorption Data

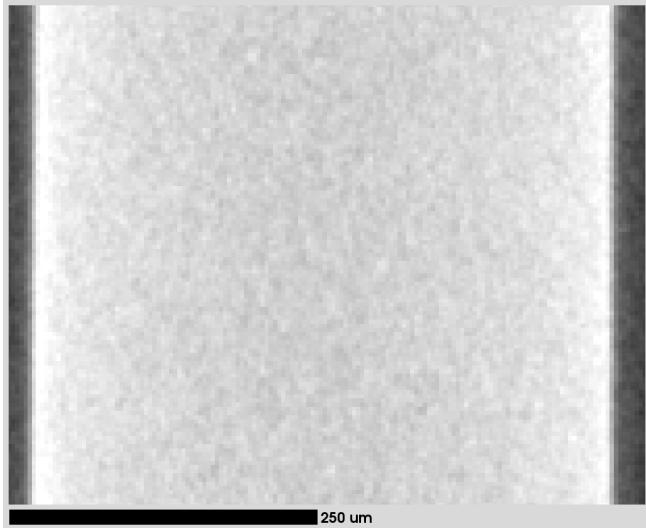


Segmented Absorption Data



Side View, Slice 94 of 190

Raw Absorption Data



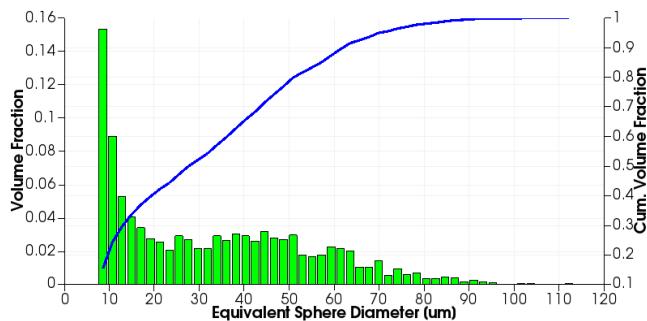
Segmented Absorption Data



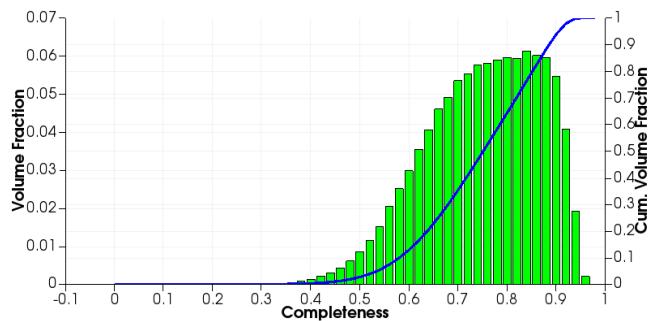
# Grain Reconstruction

## Grain Statistics

### Grain Size Distribution

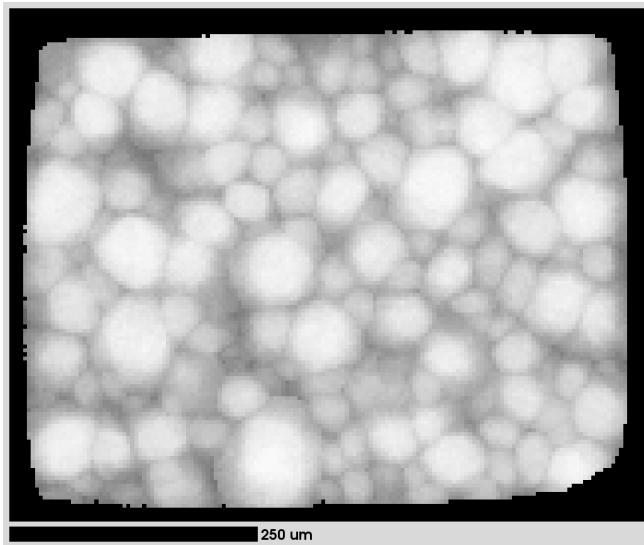


### Completeness Distribution

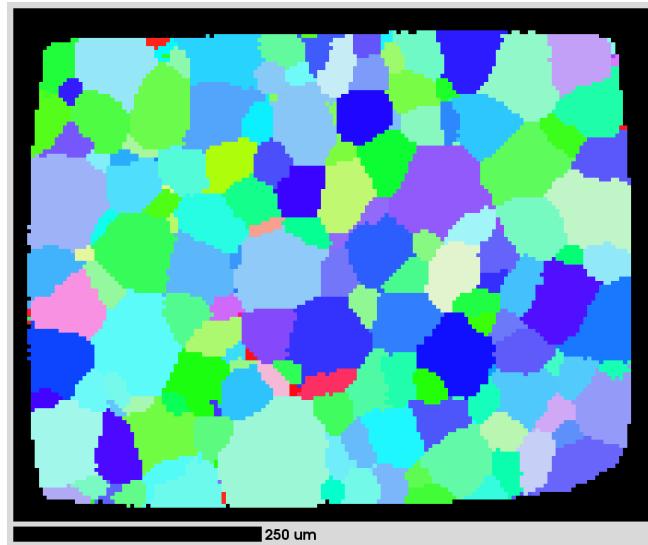


## Top View, Slice 50 of 101

### Completeness Map

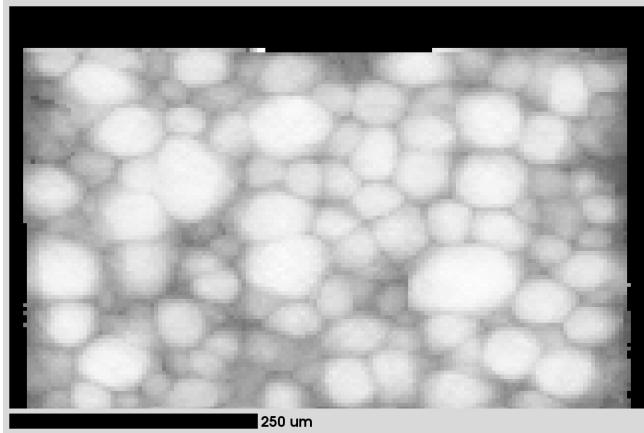


### IPF (+Z) Map

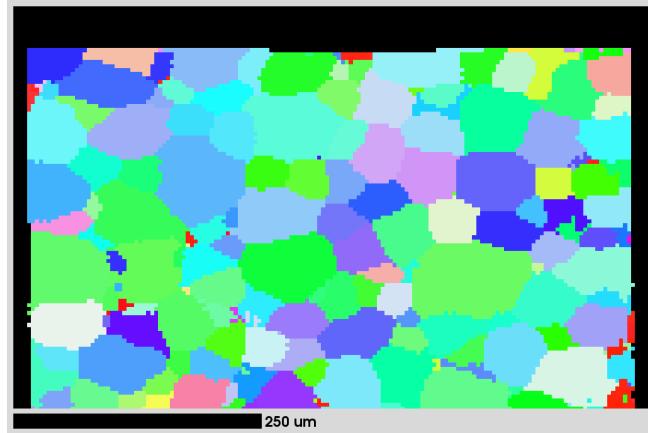


## Front View, Slice 64 of 129

### Completeness Map

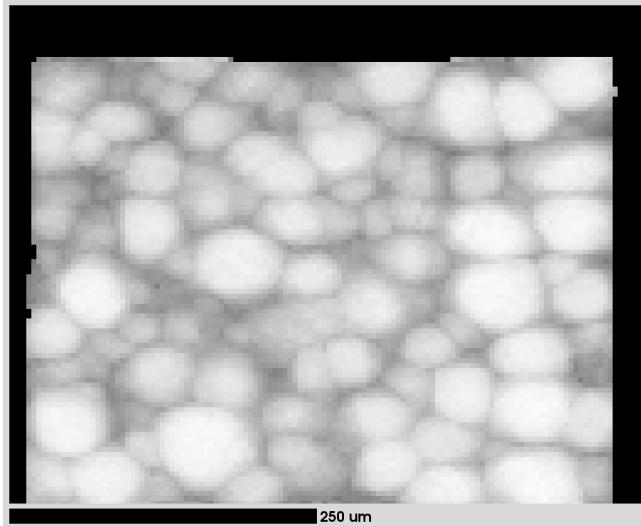


### IPF (+Z) Map

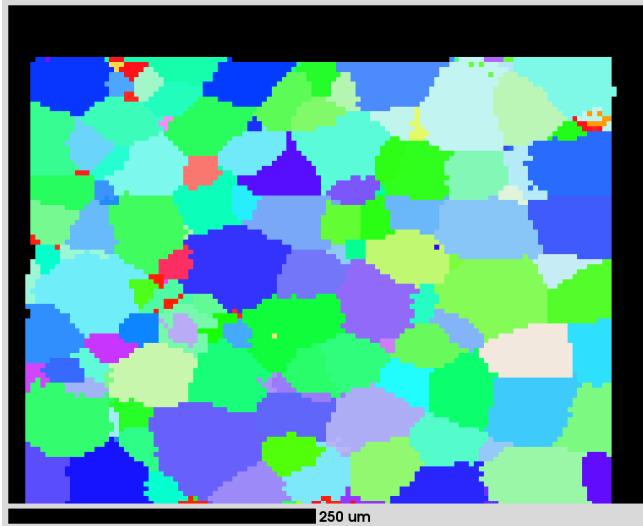


## Side View, Slice 79 of 160

Completeness Map



IPF (+Z) Map



Titanium IPF (+Z)

