GrainMapper3D Spotlight

Al-5wt%Cu Sample Annealing Series

Sample Description

- Al-5wt% Cu
- Crystal system: face-centered cubic (Fm3m)
- Dimension: 1.4 mm (diameter) × 6.5 mm (length)
- Annealing treatment: 15 min @ 630°C, air cooling to RT
- Annealing steps: 10

Sample Courtesy: Dr. Jules Dake, Ulm University, Germany

Figure: Grain size distribution and 3D grain map colored by grain size, initial sample state (t0).

References:

Figure: Evolution of three neighboring grains after 15min, 75min and 135min annealing at 630°C respectively. The grain sizes in equivalent sphere diameter are given in the table.

<table>
<thead>
<tr>
<th>Grain size (ESD in µm)</th>
<th>t1</th>
<th>t5</th>
<th>t9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain 1</td>
<td>244.2</td>
<td>243.6</td>
<td>233.6</td>
</tr>
<tr>
<td>Grain 2</td>
<td>231.5</td>
<td>243.7</td>
<td>215.9</td>
</tr>
<tr>
<td>Grain 3</td>
<td>362.7</td>
<td>394.3</td>
<td>427.9</td>
</tr>
</tbody>
</table>

Open access datasets:
https://doi.org/10.18126/5Q8S-3EF9
**Data Acquisition Parameters**

**System:** ZEISS Xradia 520 Versa with LabDCT Pro

**Absorption Contrast Tomography**
- **Data acquisition**: vertical stitching (5 layers)
- **Voltage**: 80 kV
- **Power**: 7 W
- **Objective**: 4x Detector
- **Source – Sample distance**: 13 mm
- **Sample – Detector distance**: 35 mm
- **Exposure**: 1s / binning 2
- **Number of projections**: 1601
- **Voxel size**: 1.84 \( \mu \text{m} \)

**Diffraction Contrast Tomography**
- **Data acquisition mode**: Helical Phyllotaxis
- **Aperture**: DCT 250 \( \times \) 750 (\( \mu \text{m} \times \mu \text{m} \))
- **Voltage**: 110 kV
- **Power**: 10 W
- **Objective**: Flat Panel Detector
- **Source – Sample distance**: 16 mm
- **Sample – Detector distance**: 246 mm
- **Exposure**: 10s / binning 2
- **Number of projections**: 2900
- **3D Grain Map voxel size**: 6 \( \mu \text{m} \)