

**NASA-USGS-Intellection
Apollo 16 Drive Tube Core Characterisation Project
1st February 2008**



Investigation Team

Intellection

- Alan Butcher, Chief Scientist
- Pieter Botha, QEMSCAN[®] operator and senior consultant
- Hanna Horsch, Chief Mineralogist
- Aukje Benedictus, Application Specialist
- Adam Forsyth, GM Marketing
- Paul Gottlieb, Chief Technologist
- Craig Williams, Image Analysis Software Engineer

NASA

- Doug Rickman, MSFC
- Sue Wentworth, JSC

USGS

- Doug Stoesser, Denver

This file shows what typical lunar regolith looks like at the scale of individual particles. The work contained in the file was done jointly by Intellection, USGS and NASA. These data have been published in whole or in part in several venues, especially the Geological Society of America meeting in Houston, 2008. For technical information about this work you are encouraged to contact Doug Rickman, Project Scientist at MSFC. (doug.rickman@nasa.gov)

The samples are polished thin sections from a lunar core.

Image 6 through 9 and 40 are visible light images of the thin sections. Several have been marked as indices to the following slides. Note, thin sections of most ordinary rocks are so transparent one could easily read a newspaper through them. The lack of such transparency is an indication of how much of the material has a size less than 30 microns, which is the thickness of the section.

Slides 10 through 55 are triplets taken using a standard petrographic, optical microscope. The first image in a triplet is taken by reflecting light off the front surface of the section. The second image in a triplet is made by passing light through the section. The third image in a triplet is made by passing plane polarized light through the section and then blocking all of the light whose plane of polarization was not altered as it passed through the sample. The amount of color perceived is a function of the mineral's lattice. Isotropic materials, such as glass, will be black in the third image.

Images 56 through 69 are backscatter electron images. In several images, such as number 62, there is a box drawn on the image. The next image is a magnification of that box.

Samples Received

64002 (Houck, 1982)

One epoxy-impregnated thin-section

64002,6019

Depth range 5.0 – 8.0 cm

Eight sieved samples

64002,262

Depth range 5.0 – 5.5 cm

64001 (Basu & McKay, 1984)

One epoxy-impregnated thin-section

64001,6031

Depth range 50.0 – 53.1 cm

Eight sieved samples

64001,374

Depth range 52.0 – 52.5 cm



Samples – further details on sieved samples

64002 (Houck, 1982)

Eight sieved samples

64002,262

- 1000-500 microns
- 500-250
- 250-150
- 150-90
- 90-75
- 75-45
- 45-20
- <20

64001 (Basu & McKay, 1984)

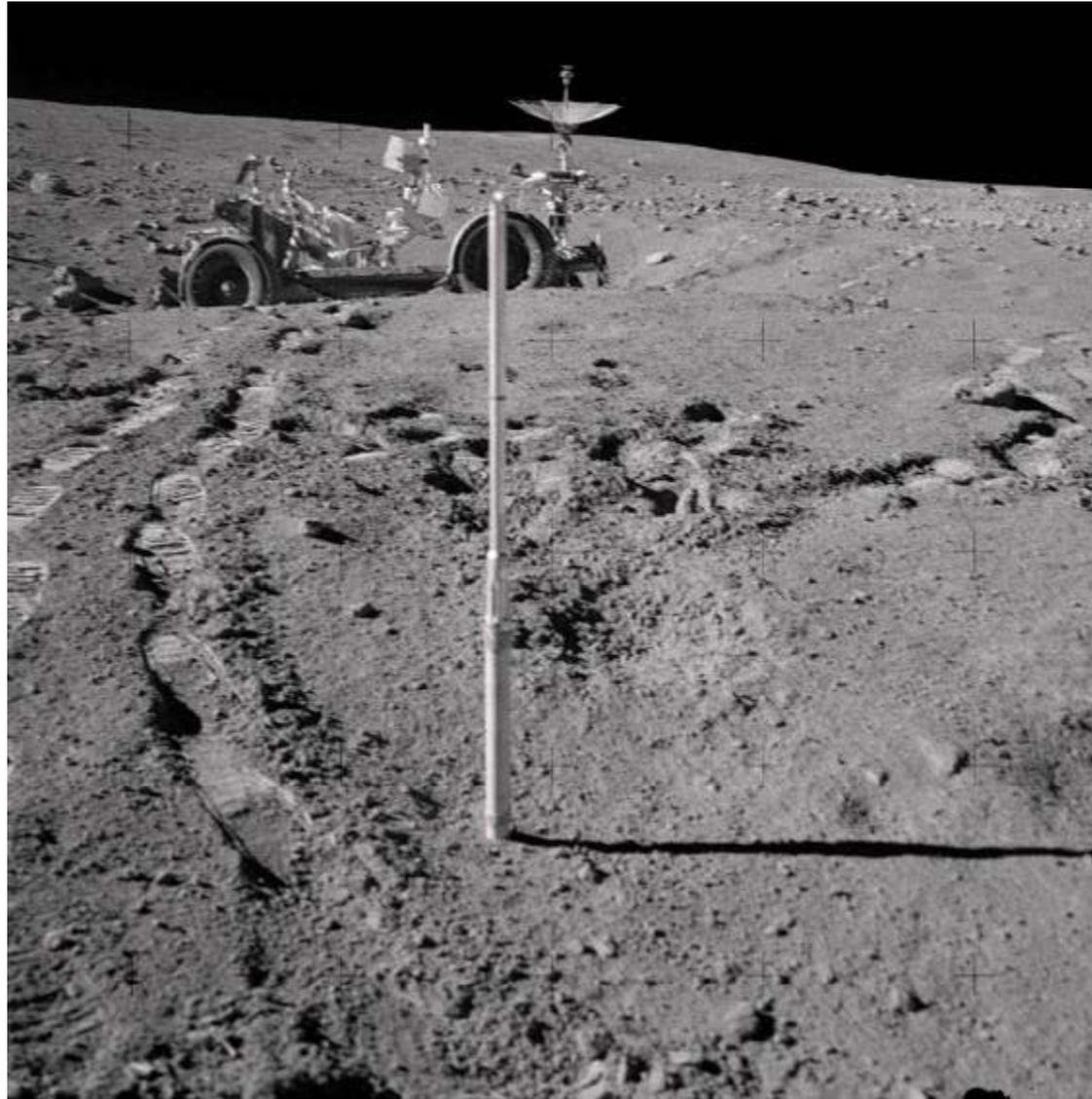
Eight sieved samples

64001,374

- 1000-500 microns
- 500-250
- 250-150
- 150-90
- 90-75
- 75-45
- 45-20
- <20



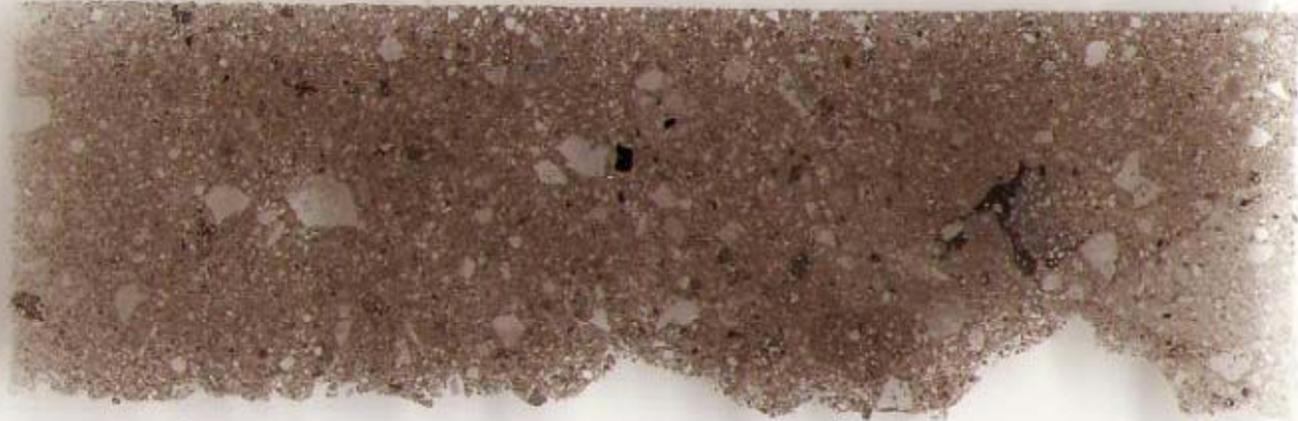
Actual Site: Station 4 EVA 2 April 22nd 1972



Source: NASA/<http://www.apolloarchive.com>

Optical Scans of thin-sections

64002,6019

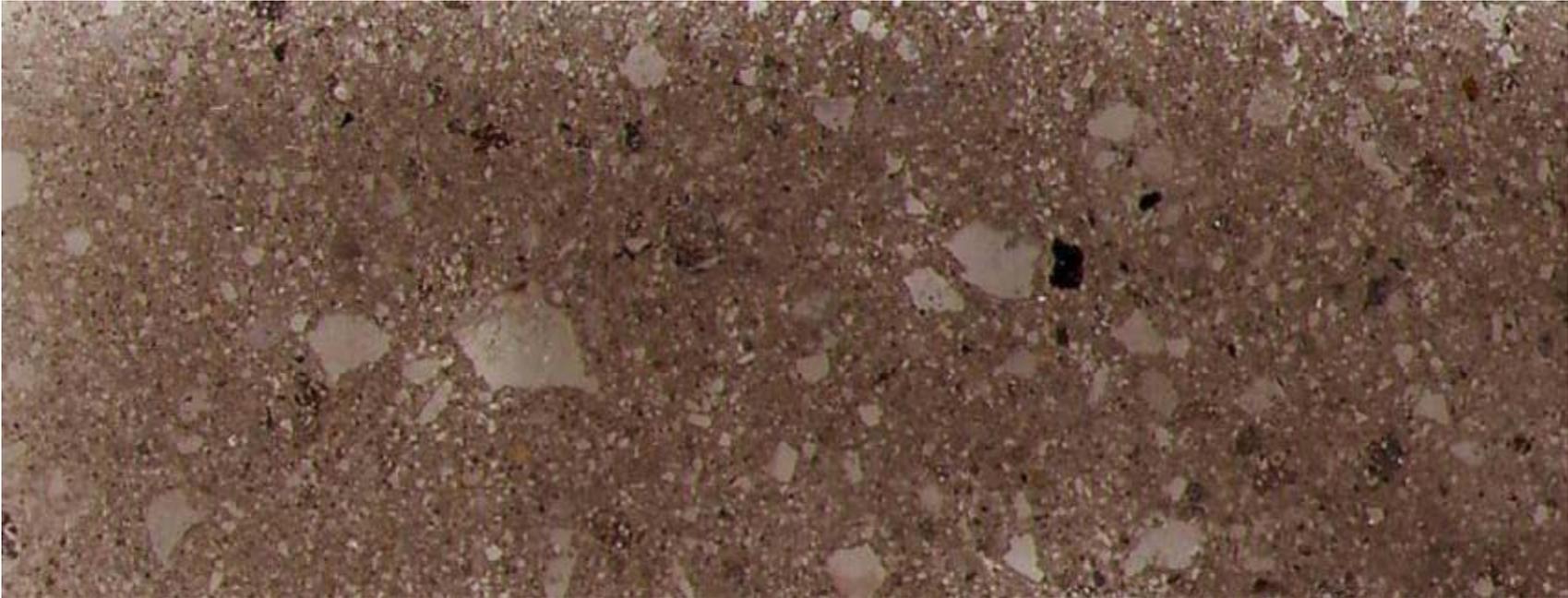


64001,6031



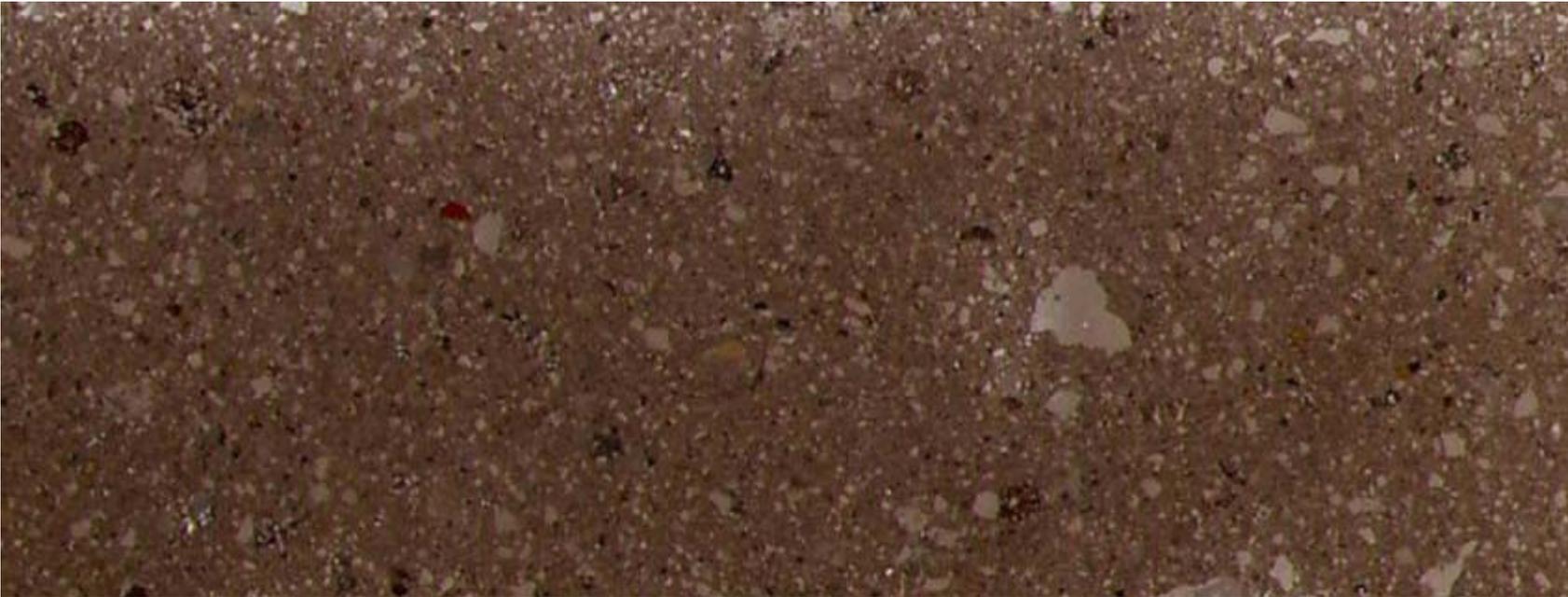
Detail of Optical Scans

64002,6019



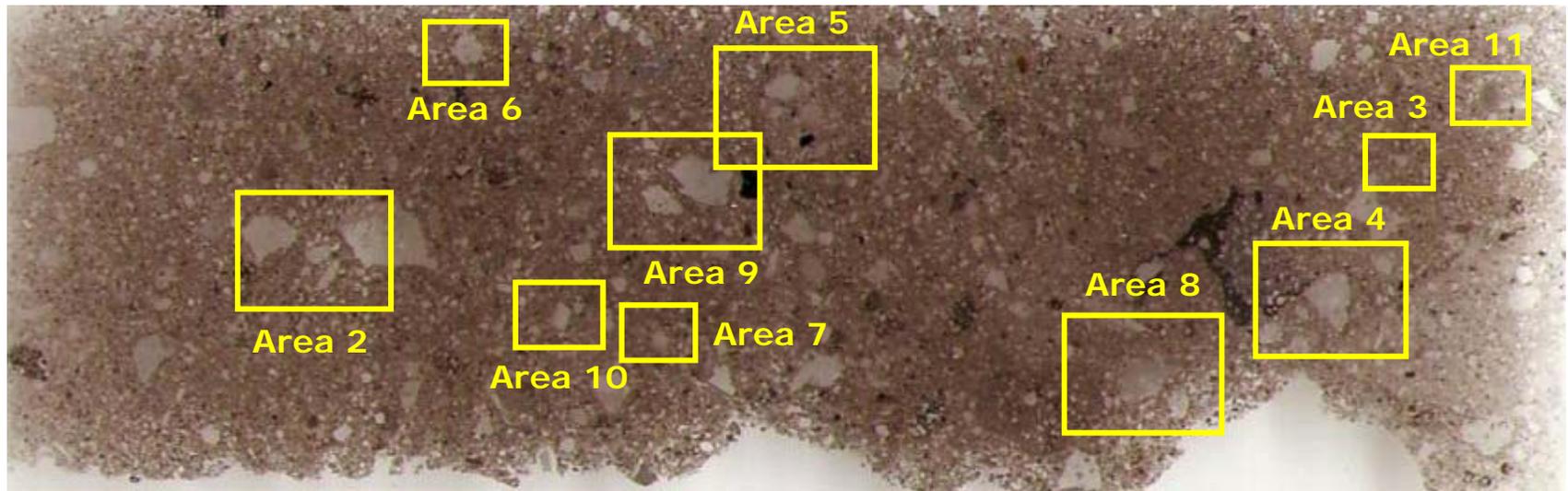
Detail of Optical Scan

64001,6031

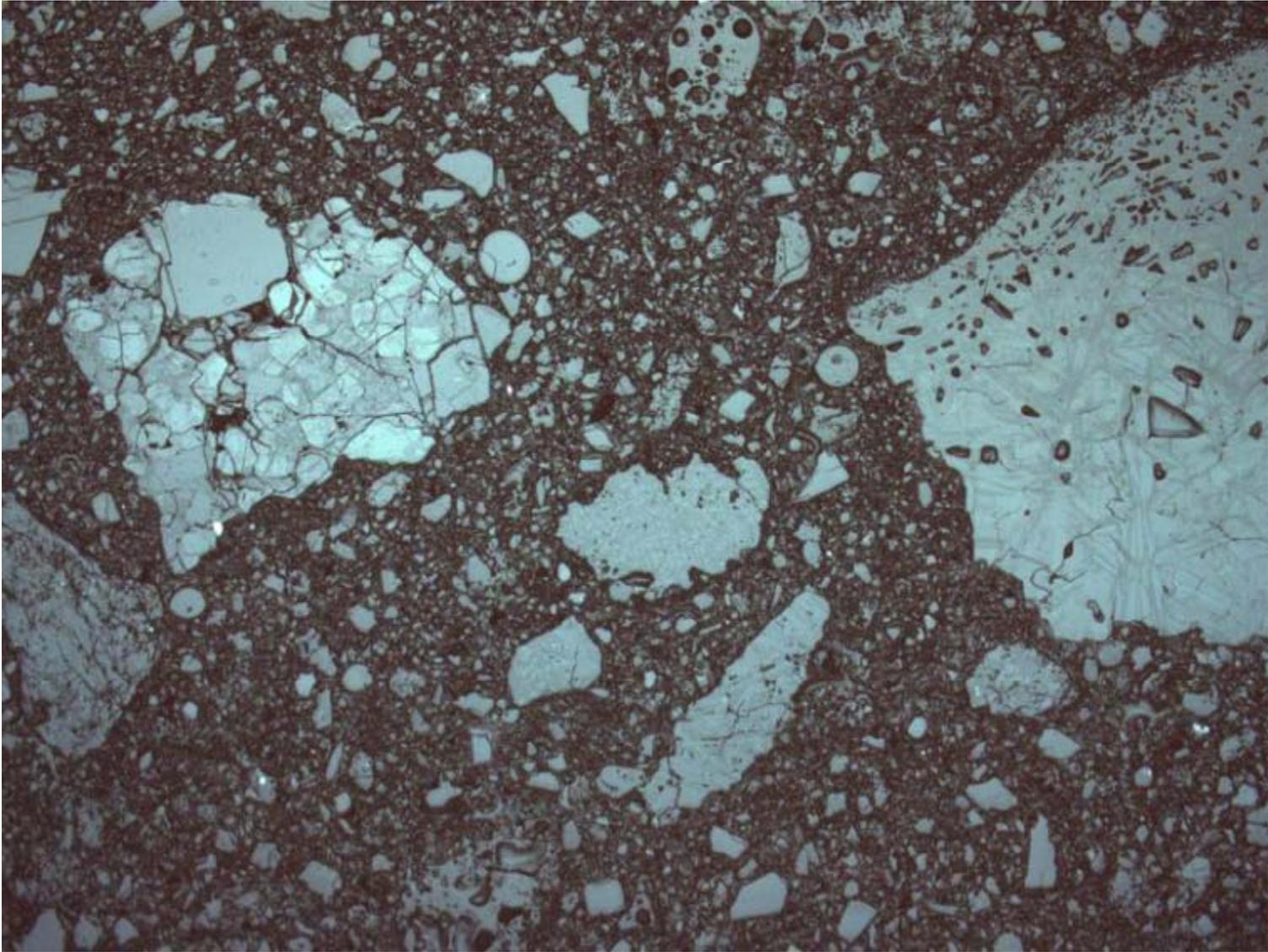


Areas photographed by optical microscope

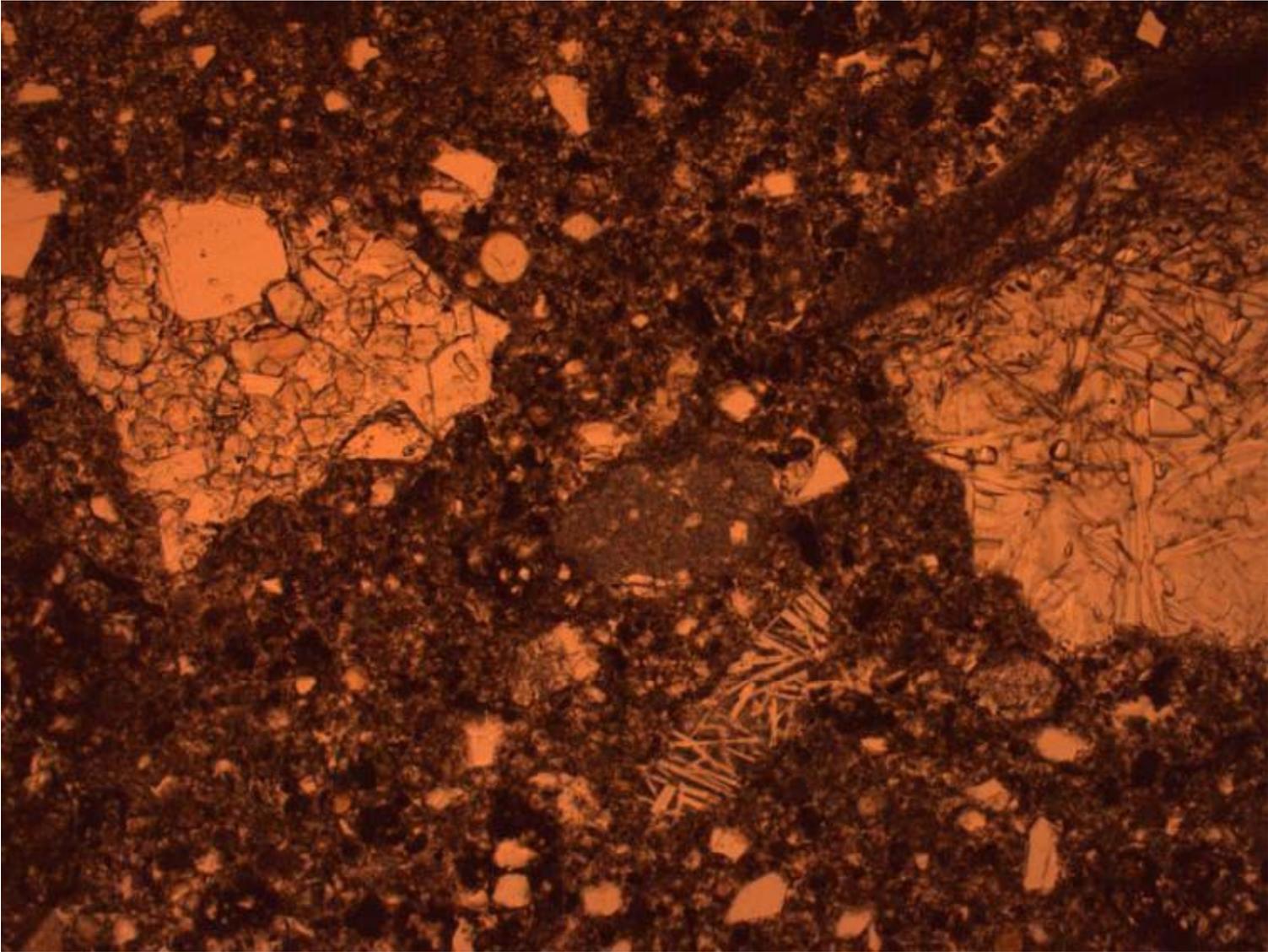
64002,6019



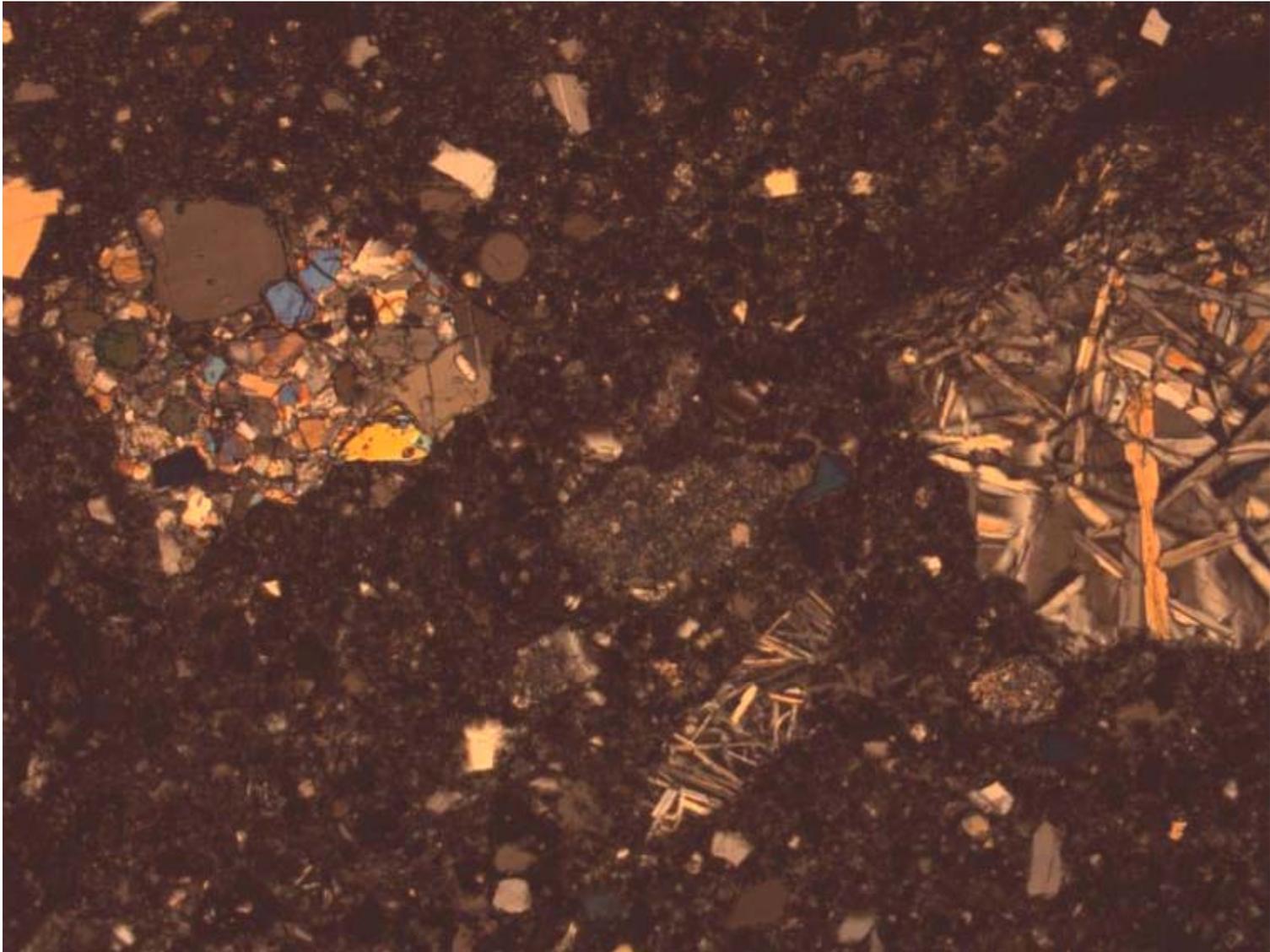
64002,6019 Area 2



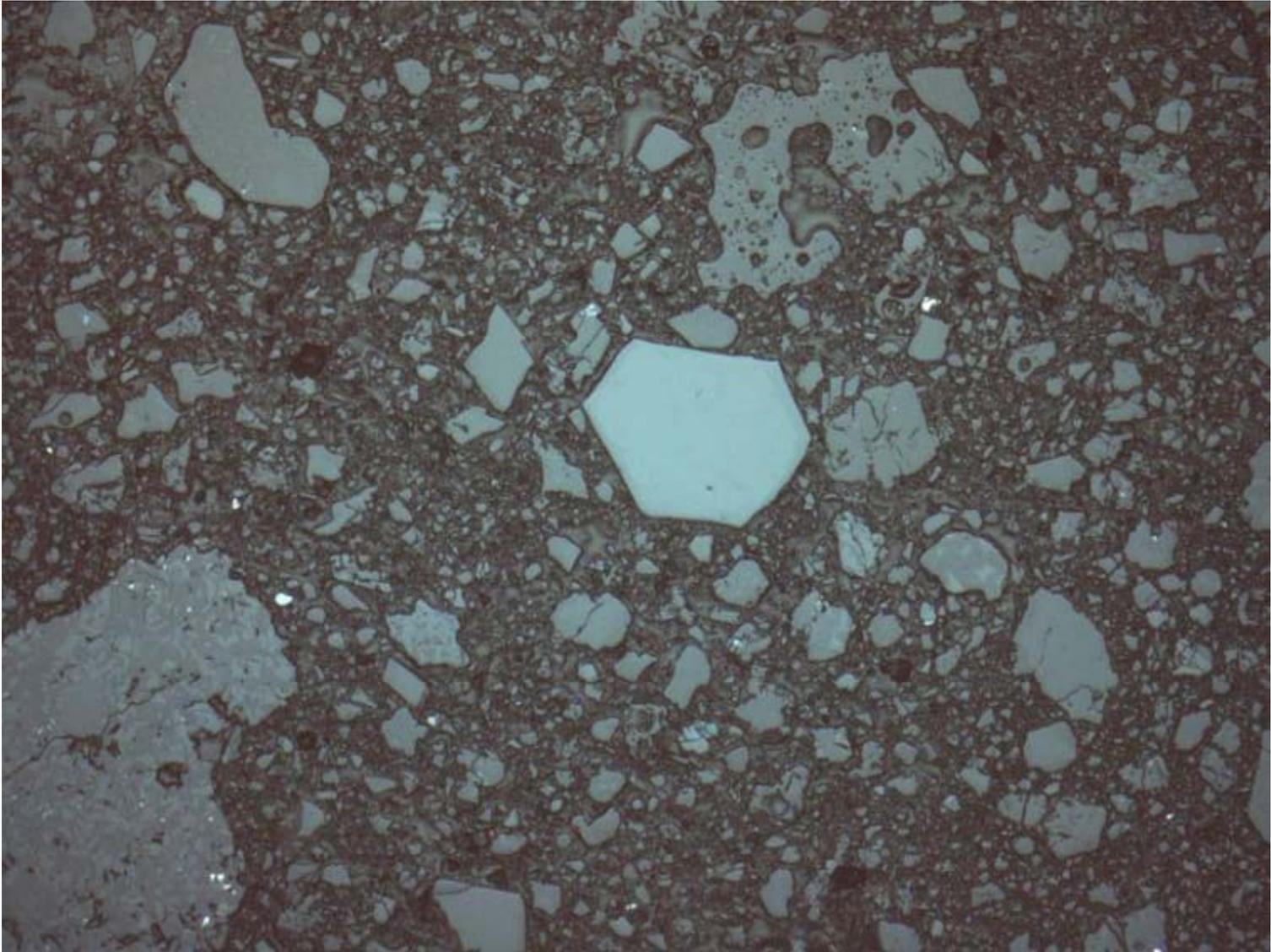
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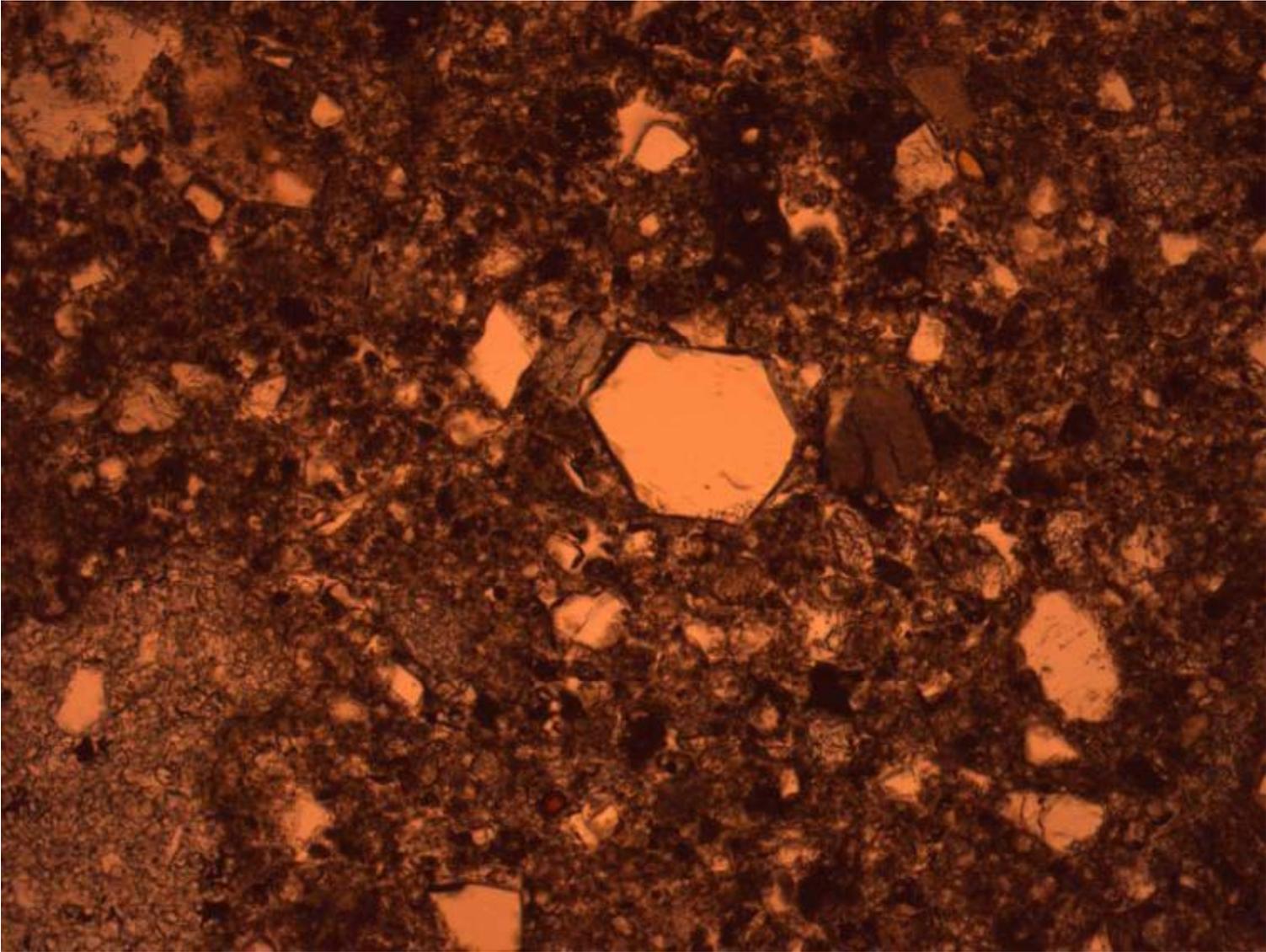
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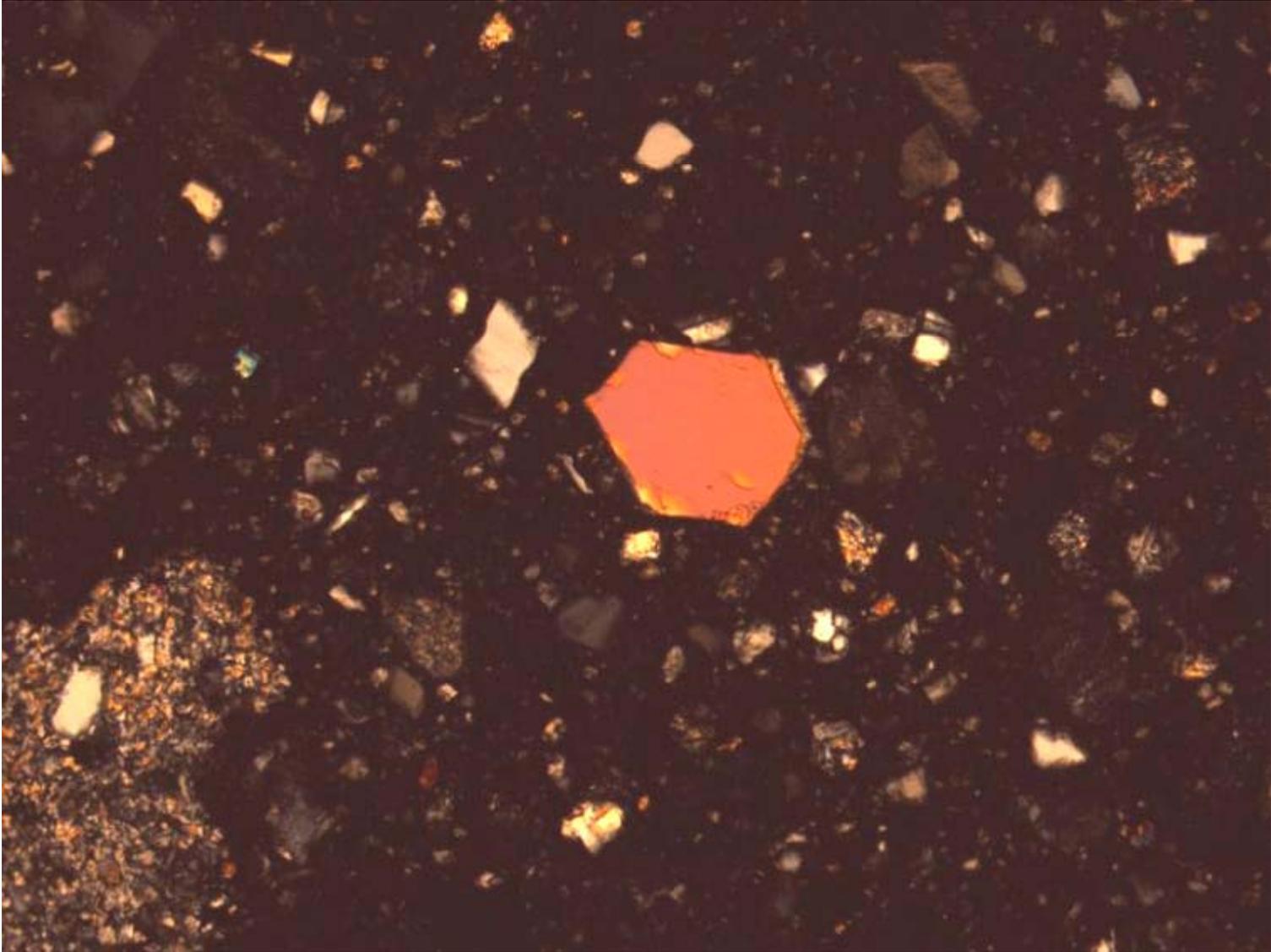
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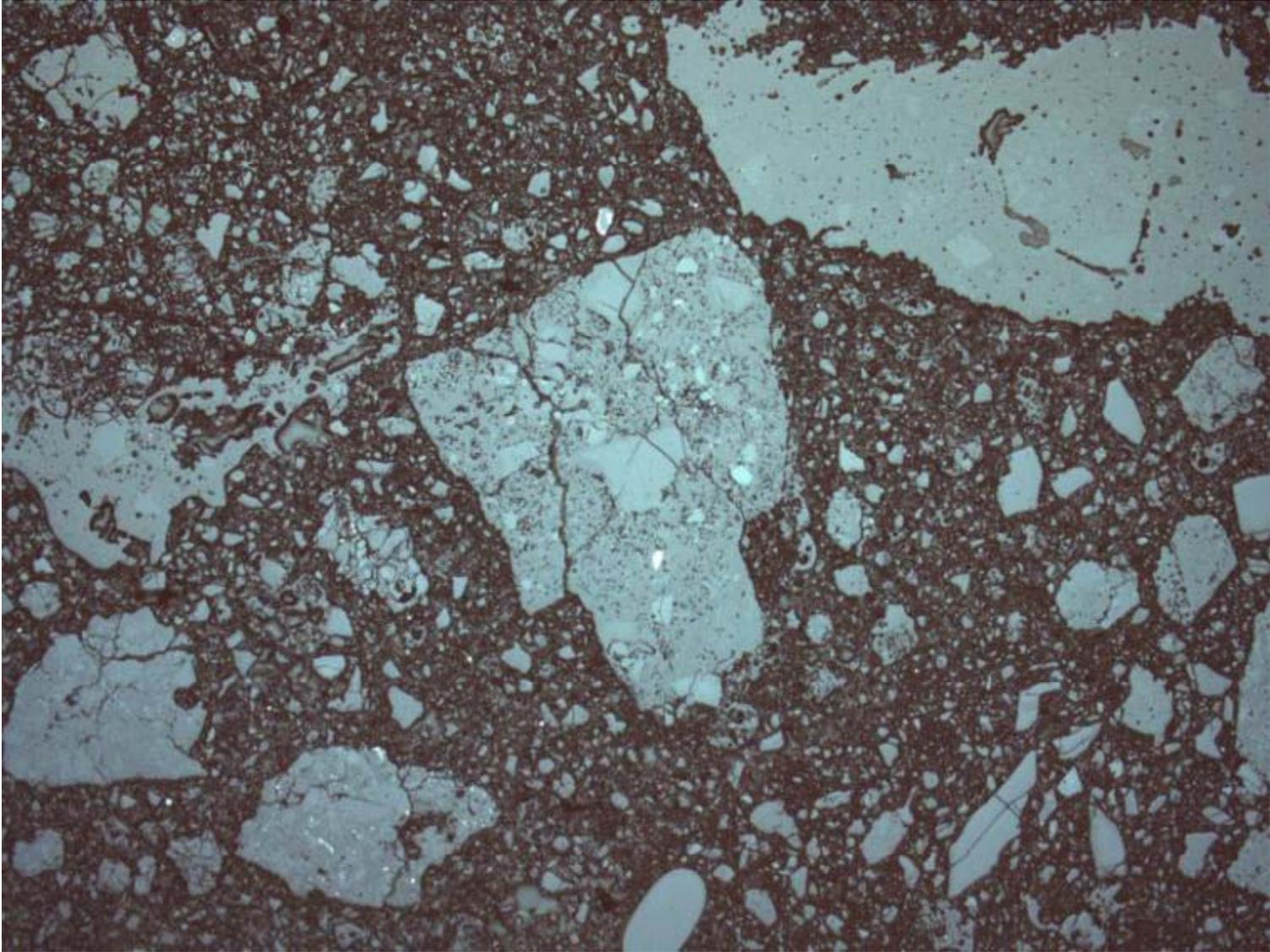
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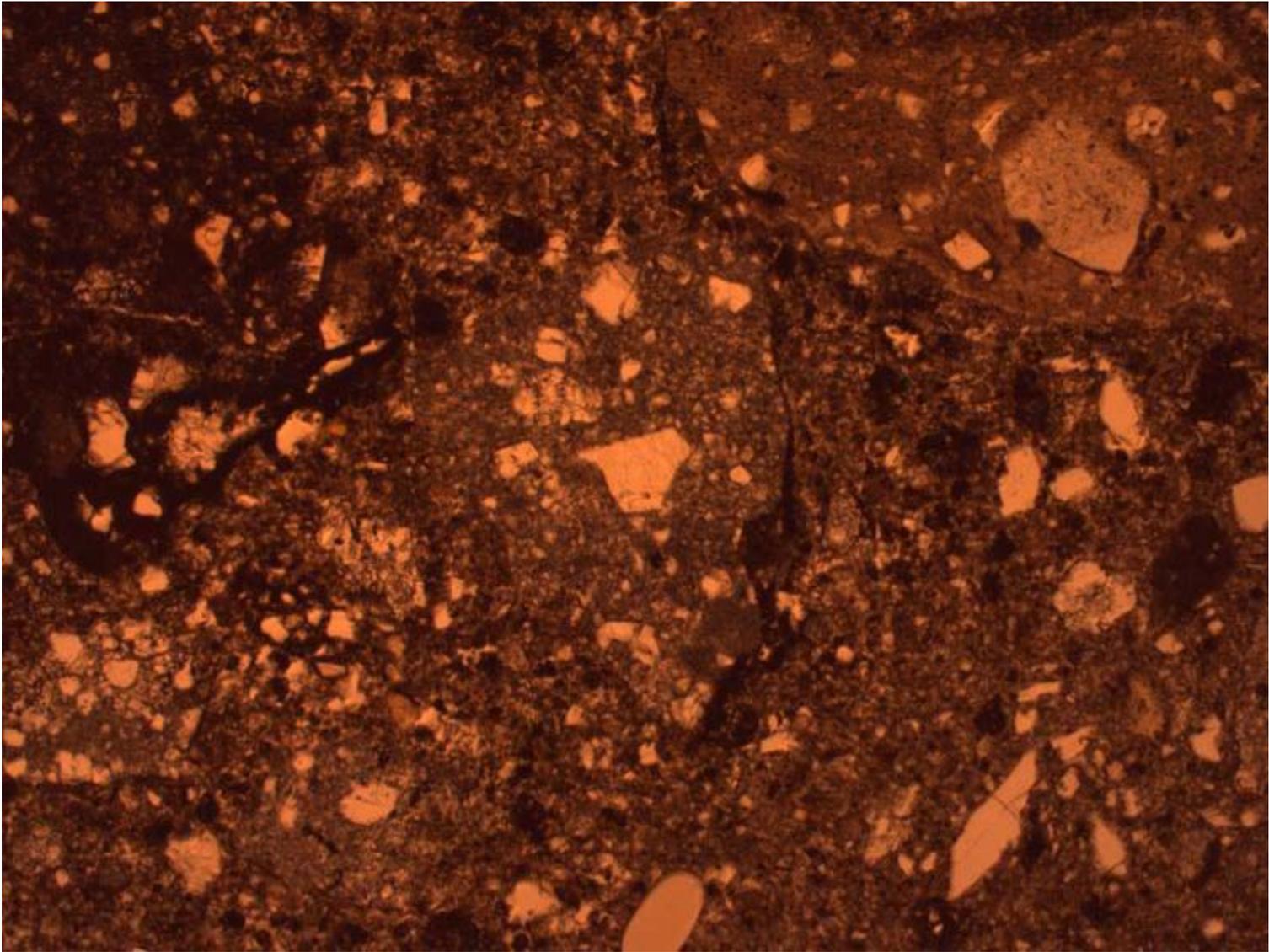
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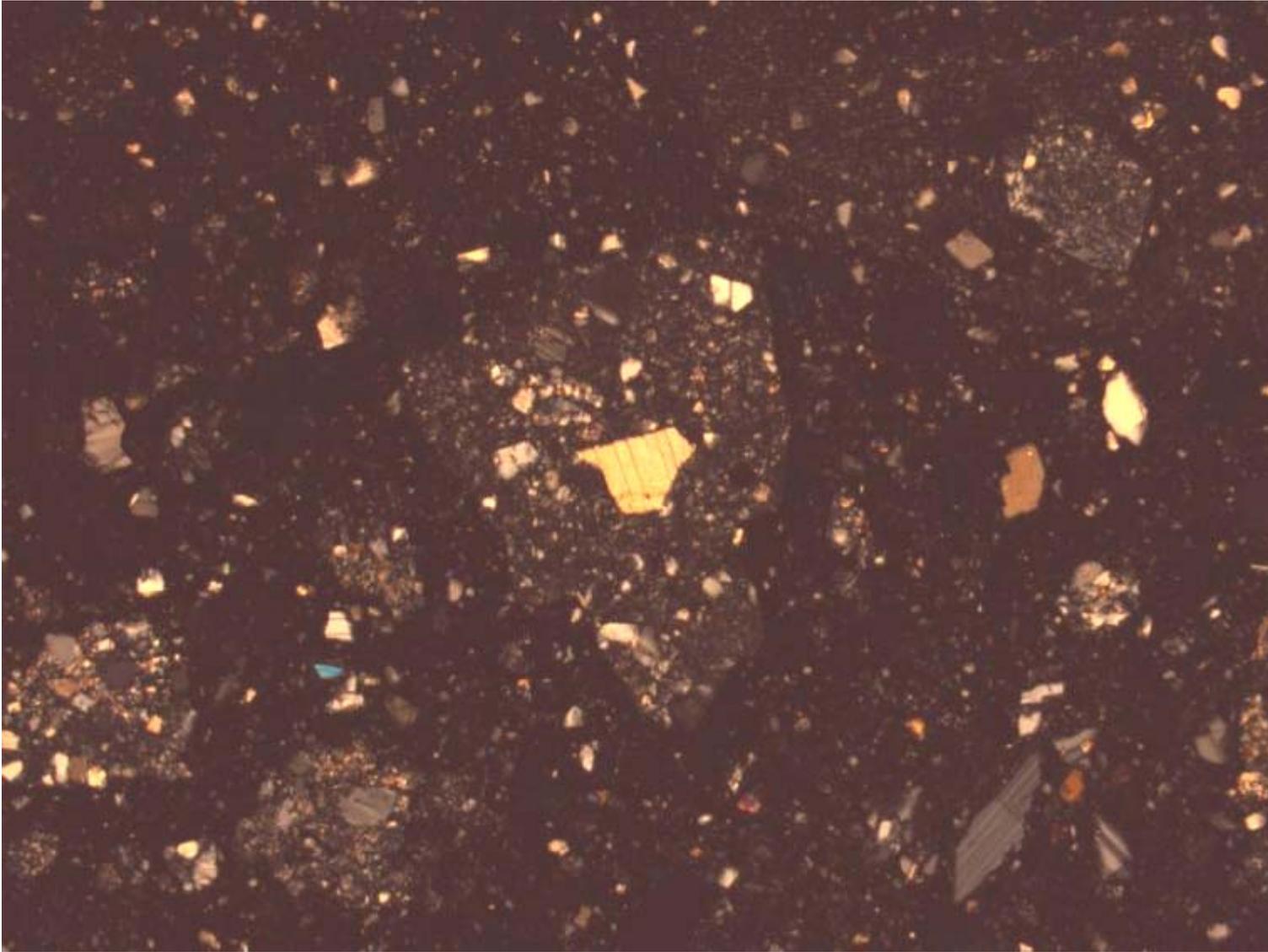
64002,6019 Area 4



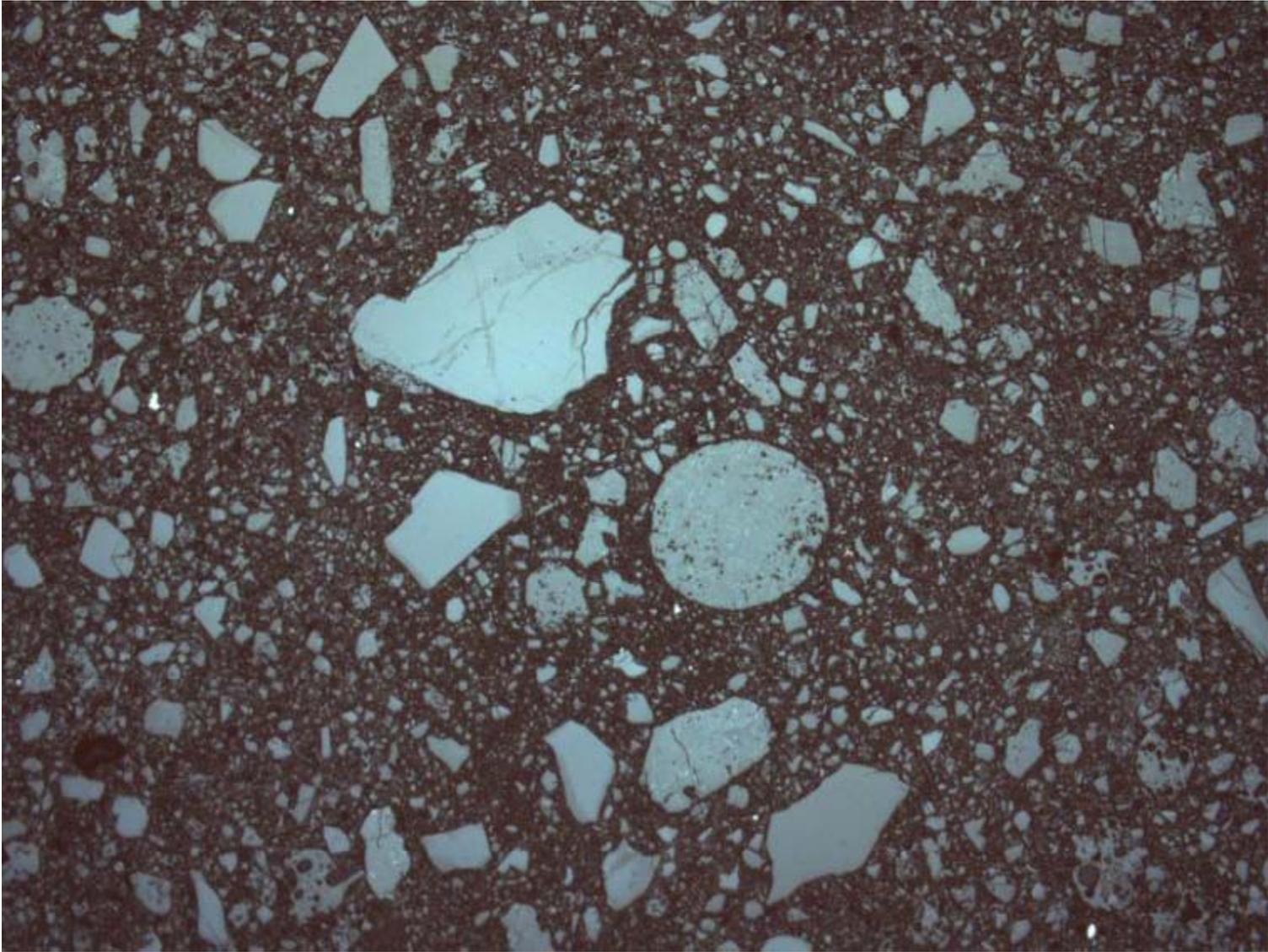
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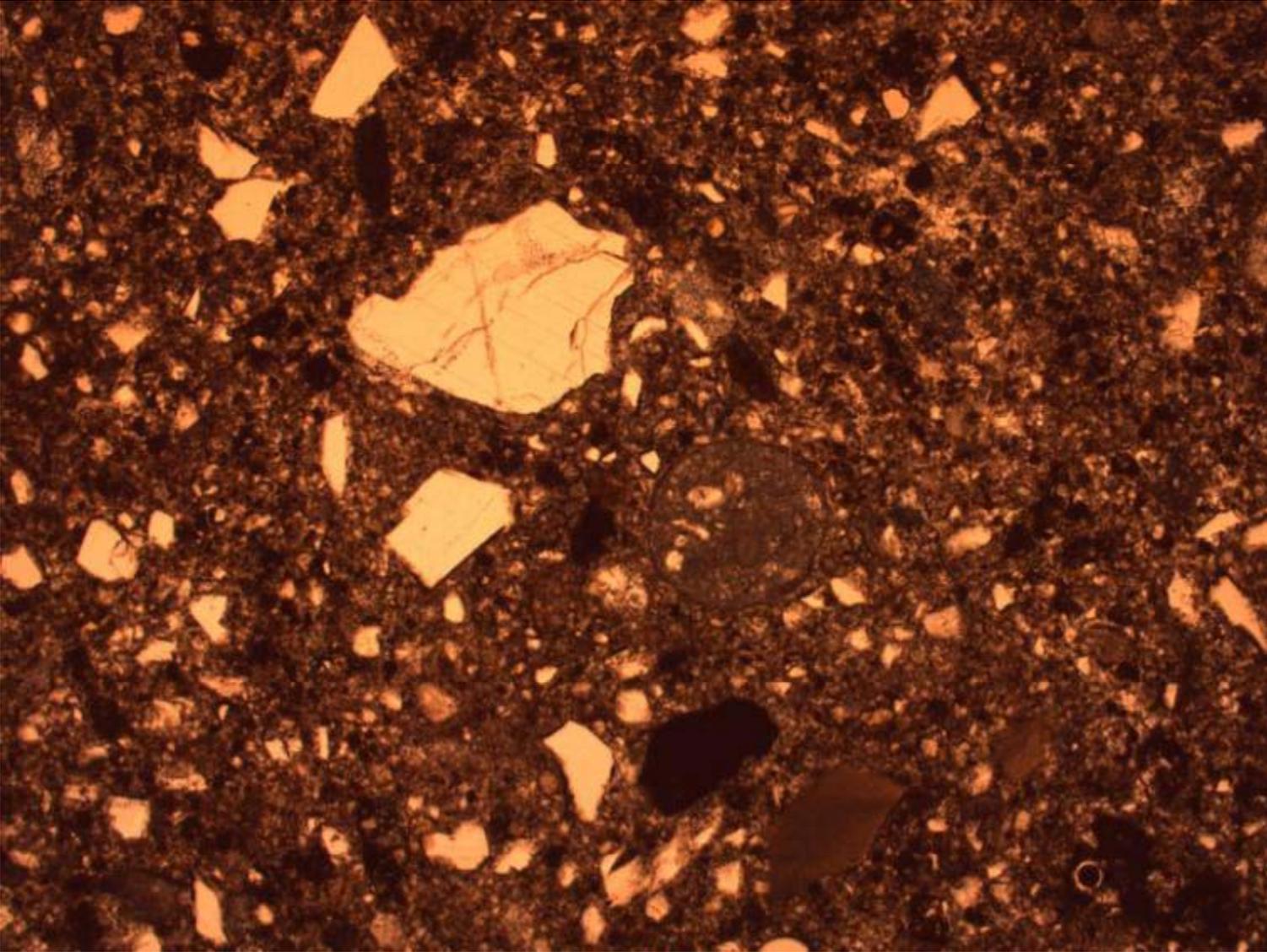
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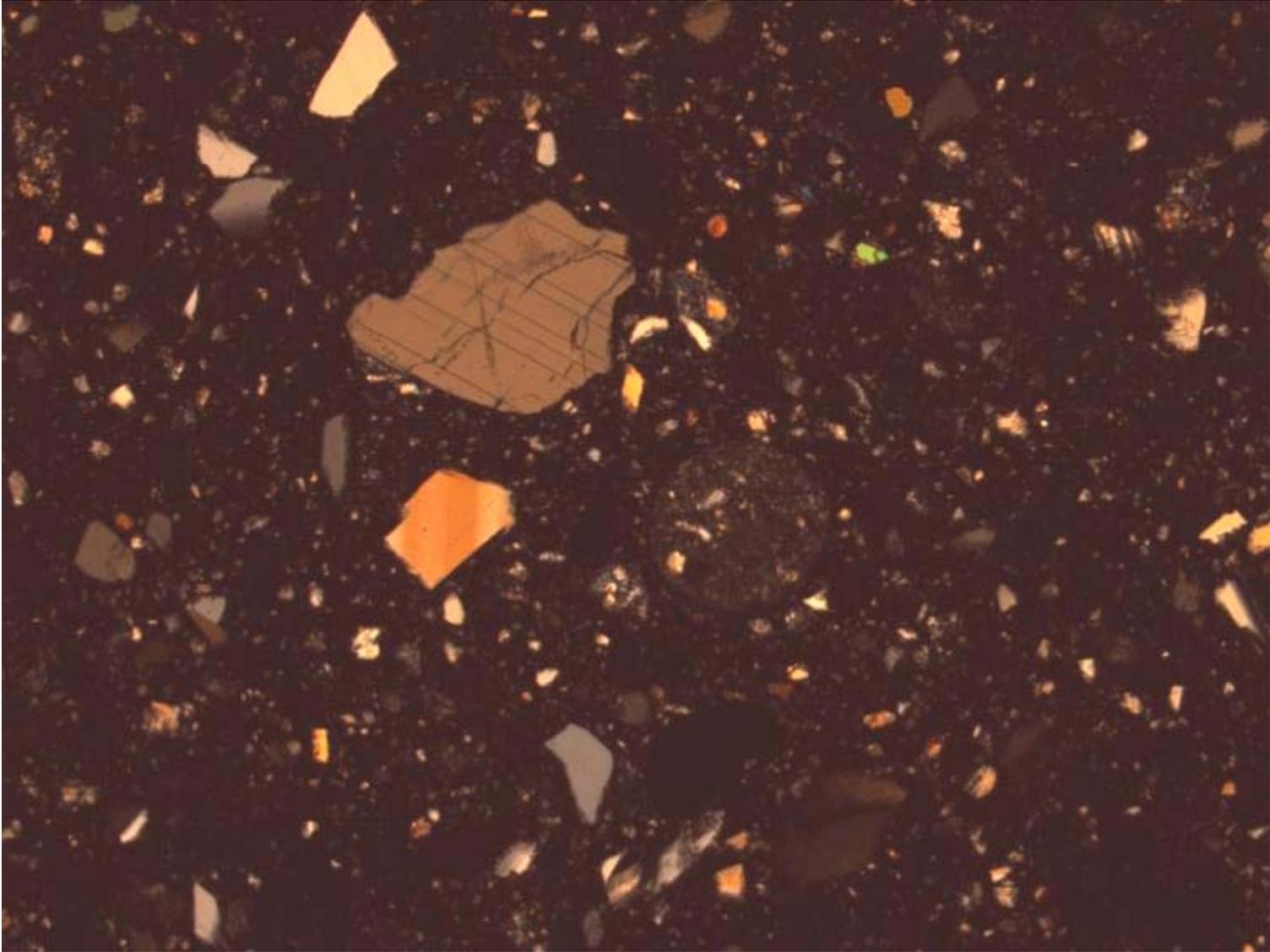
64002,6019 Area 5



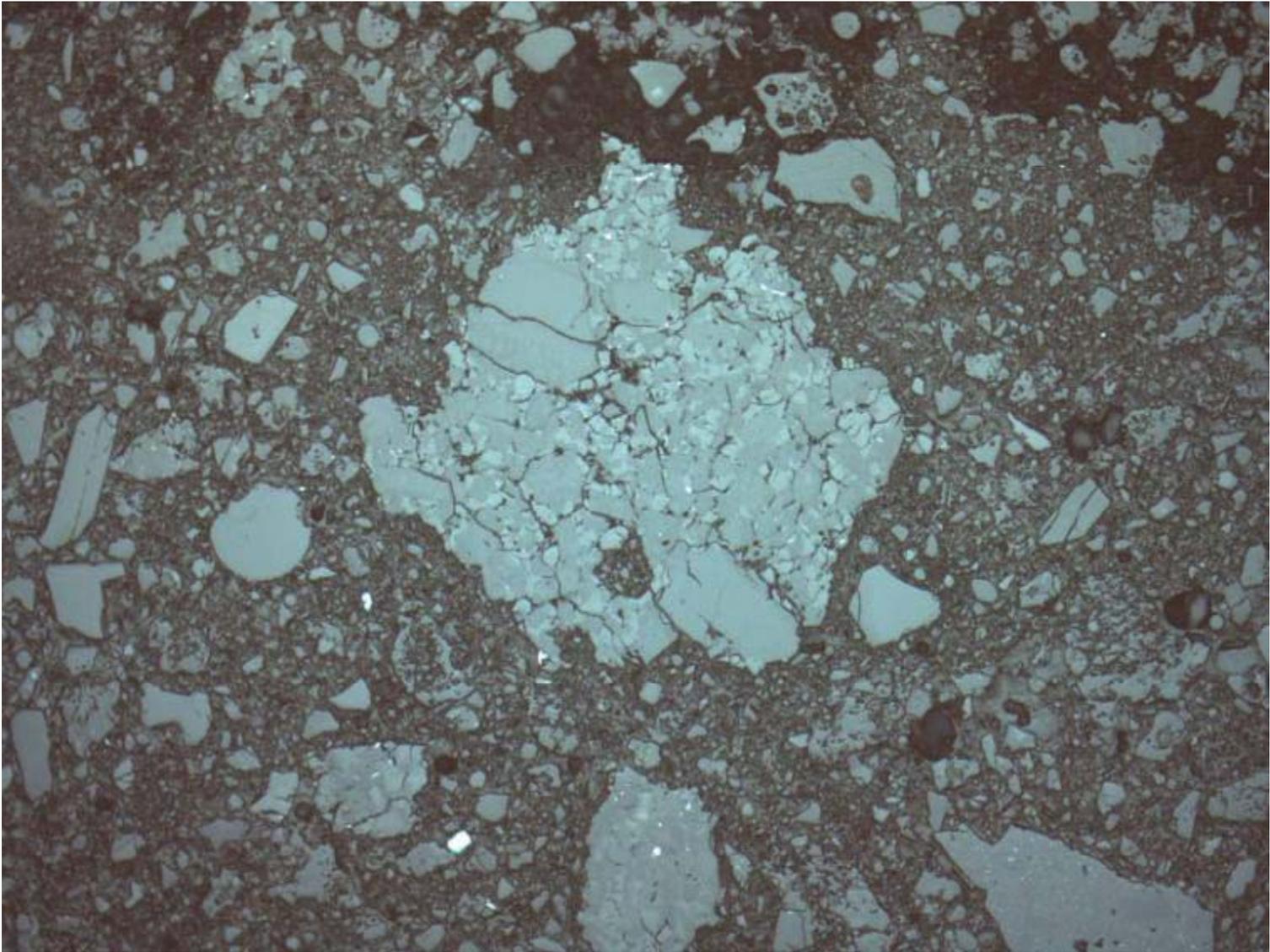
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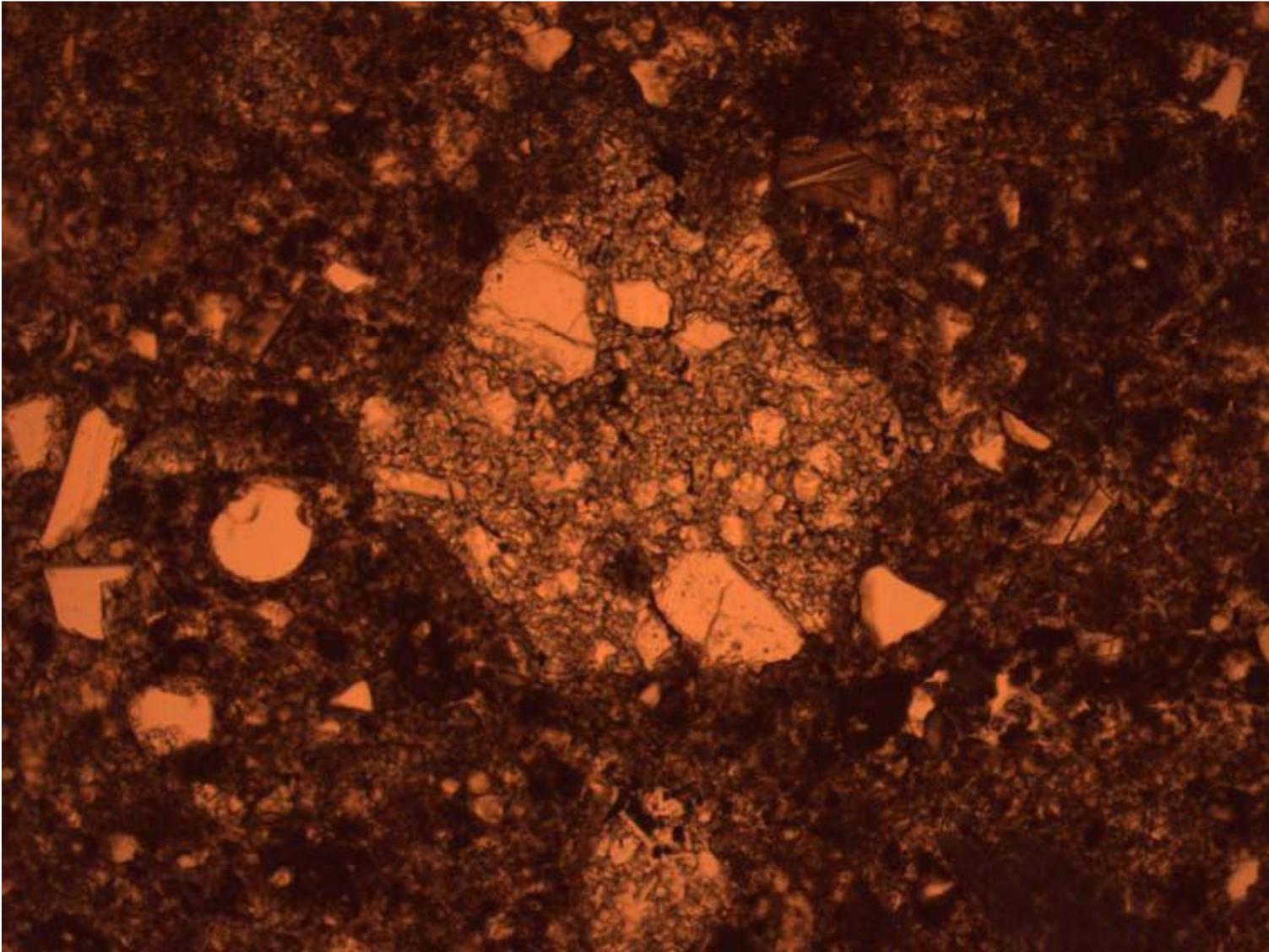
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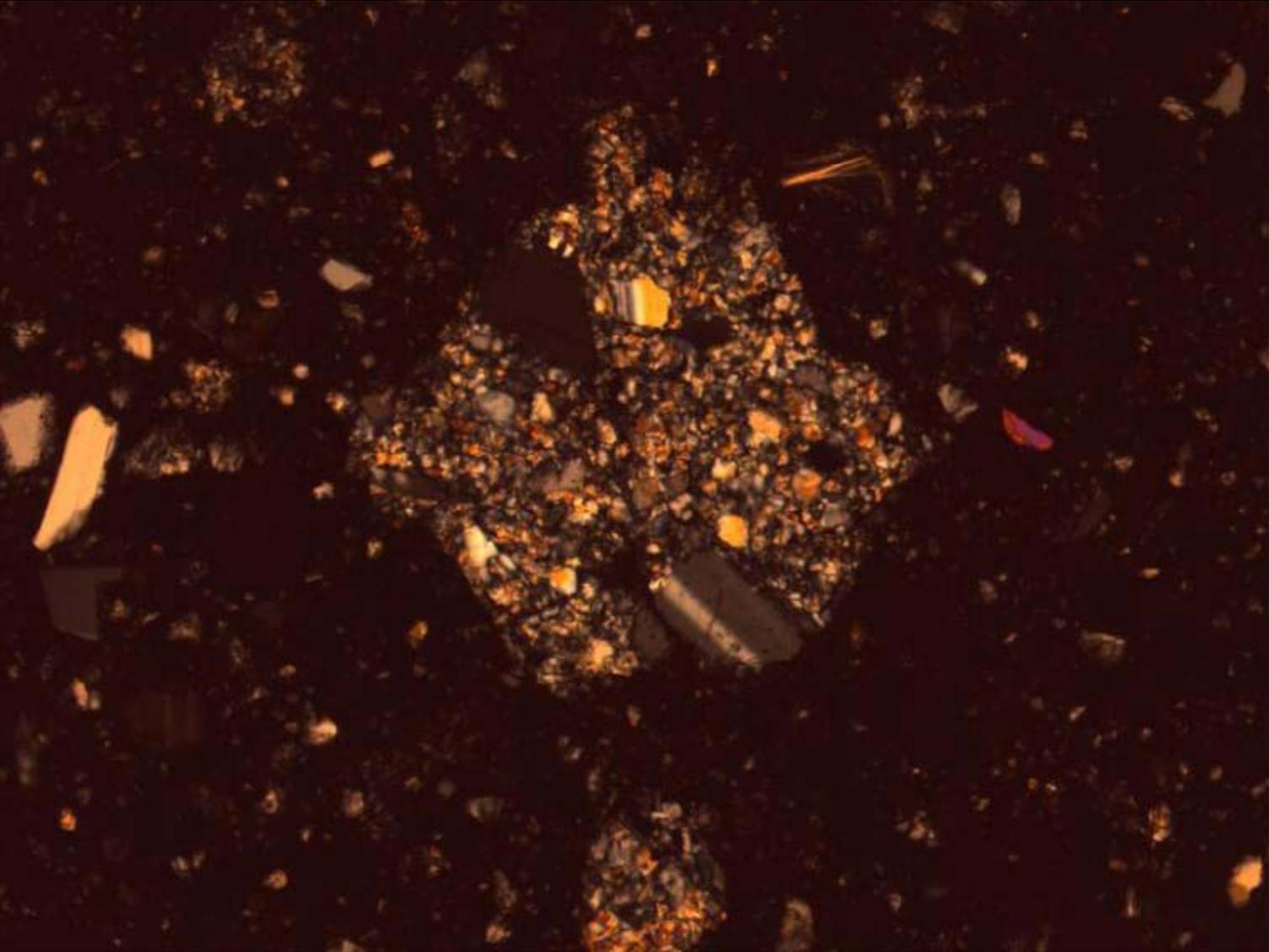
64002,6019 Area 6



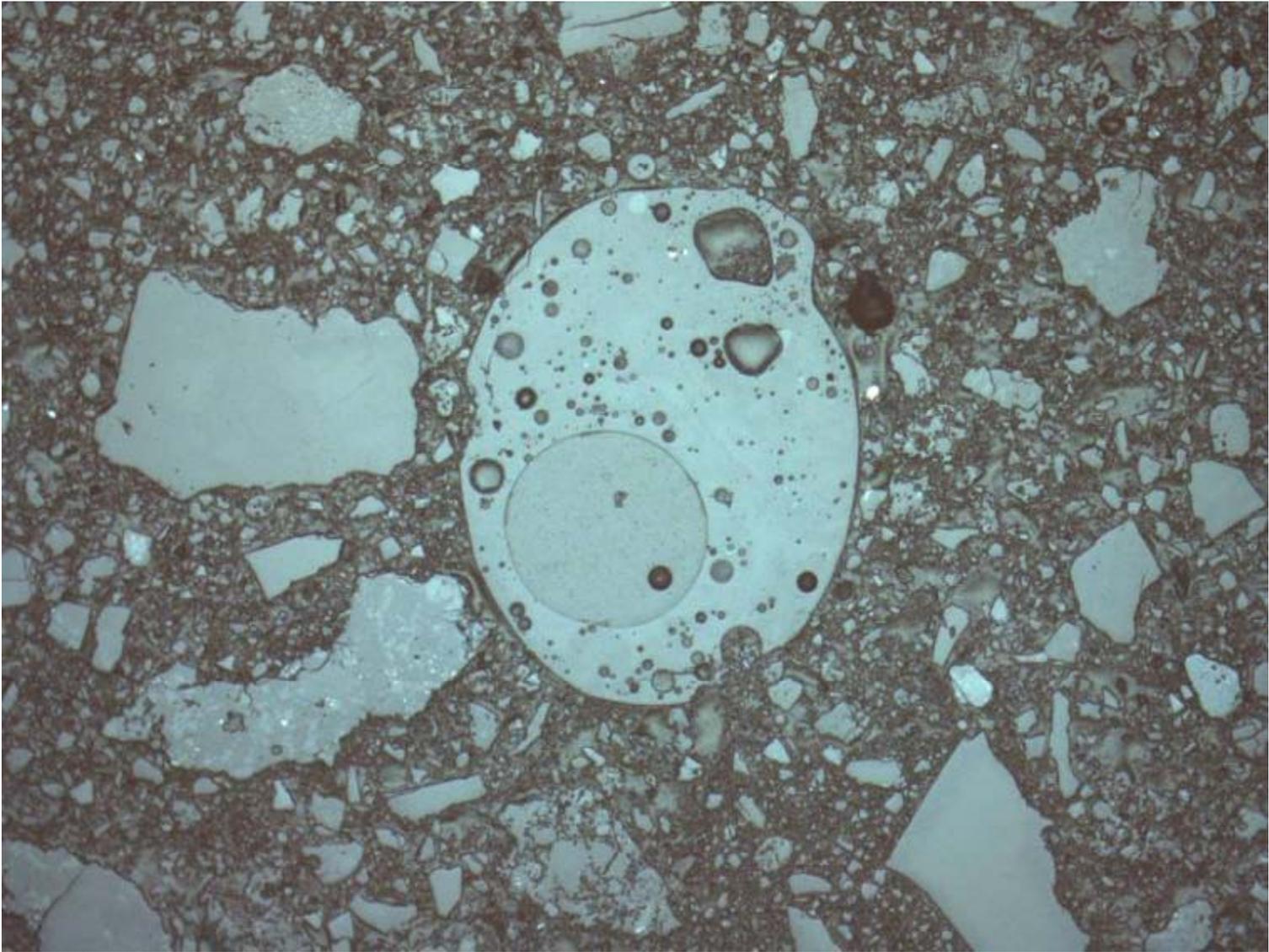
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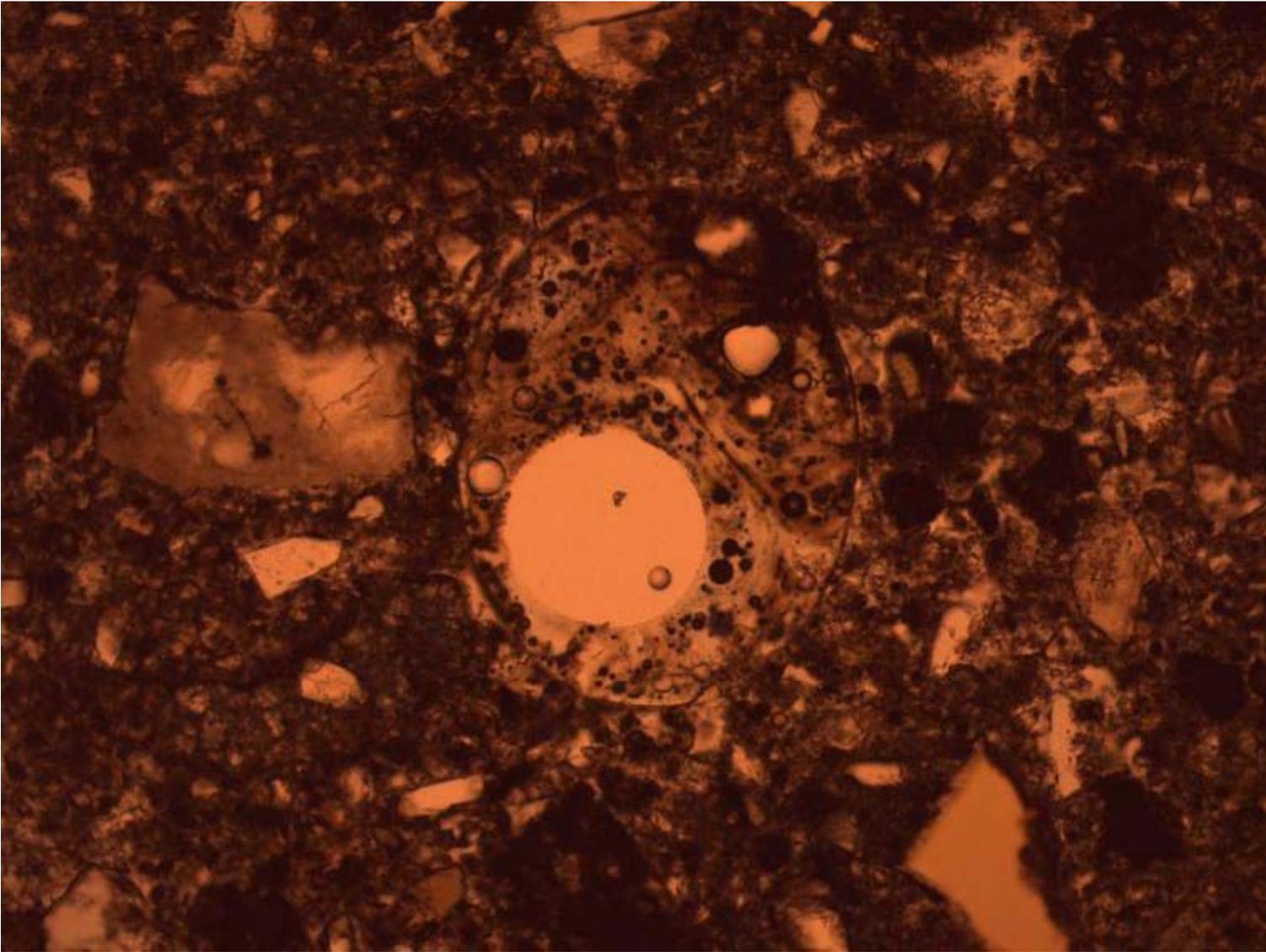
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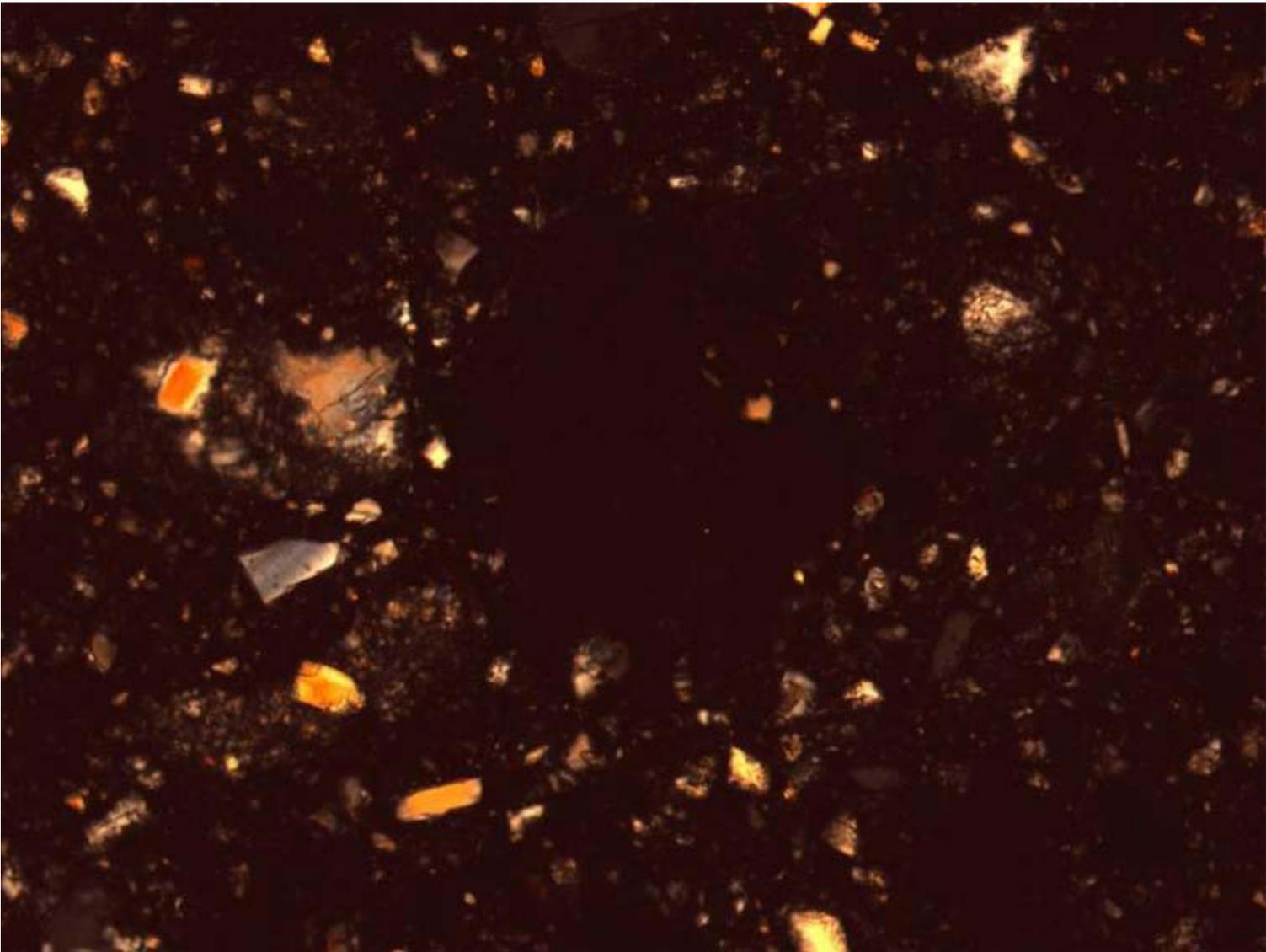
64002,6019 Area 7



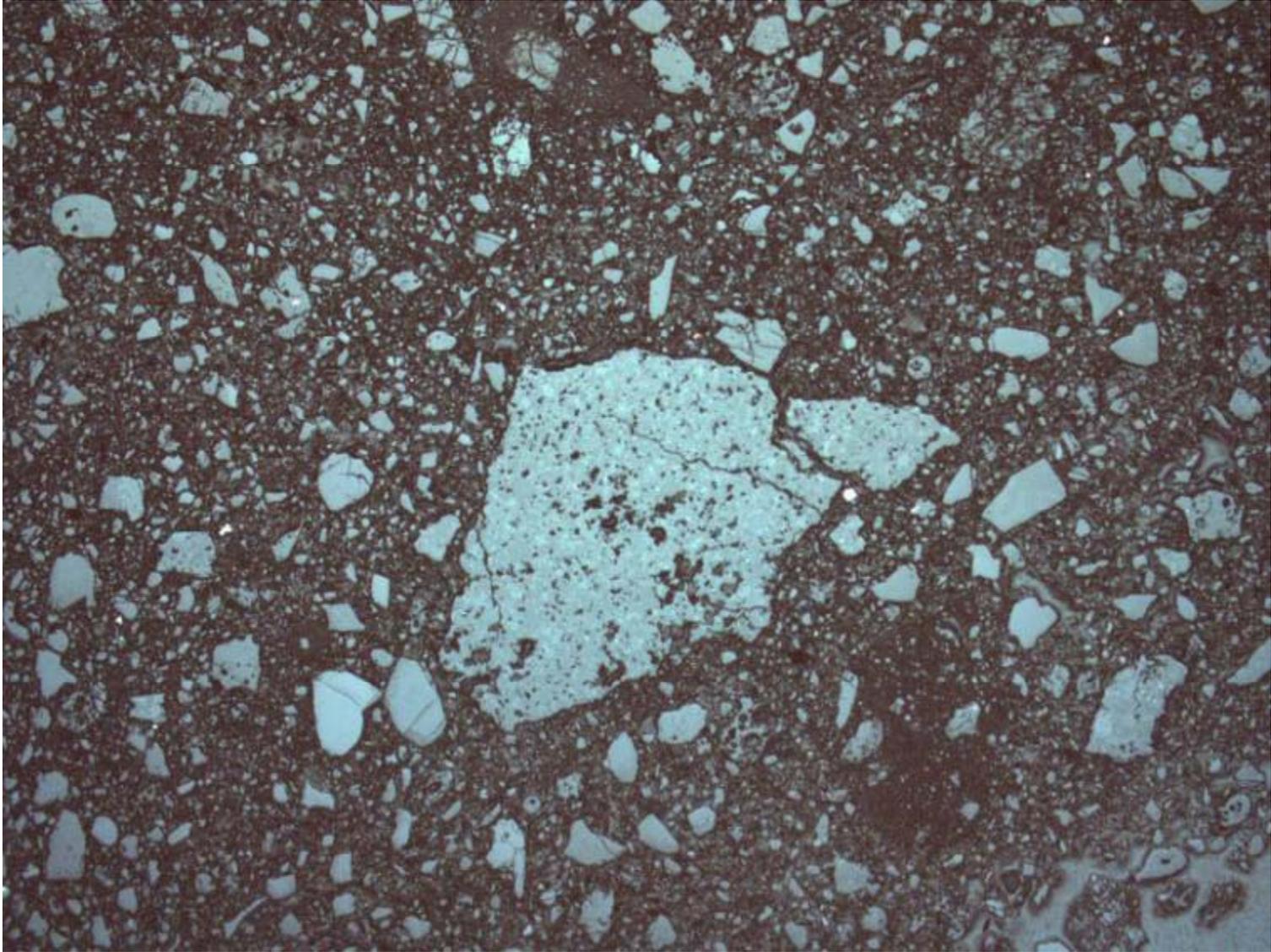
64002,6019 Area 7



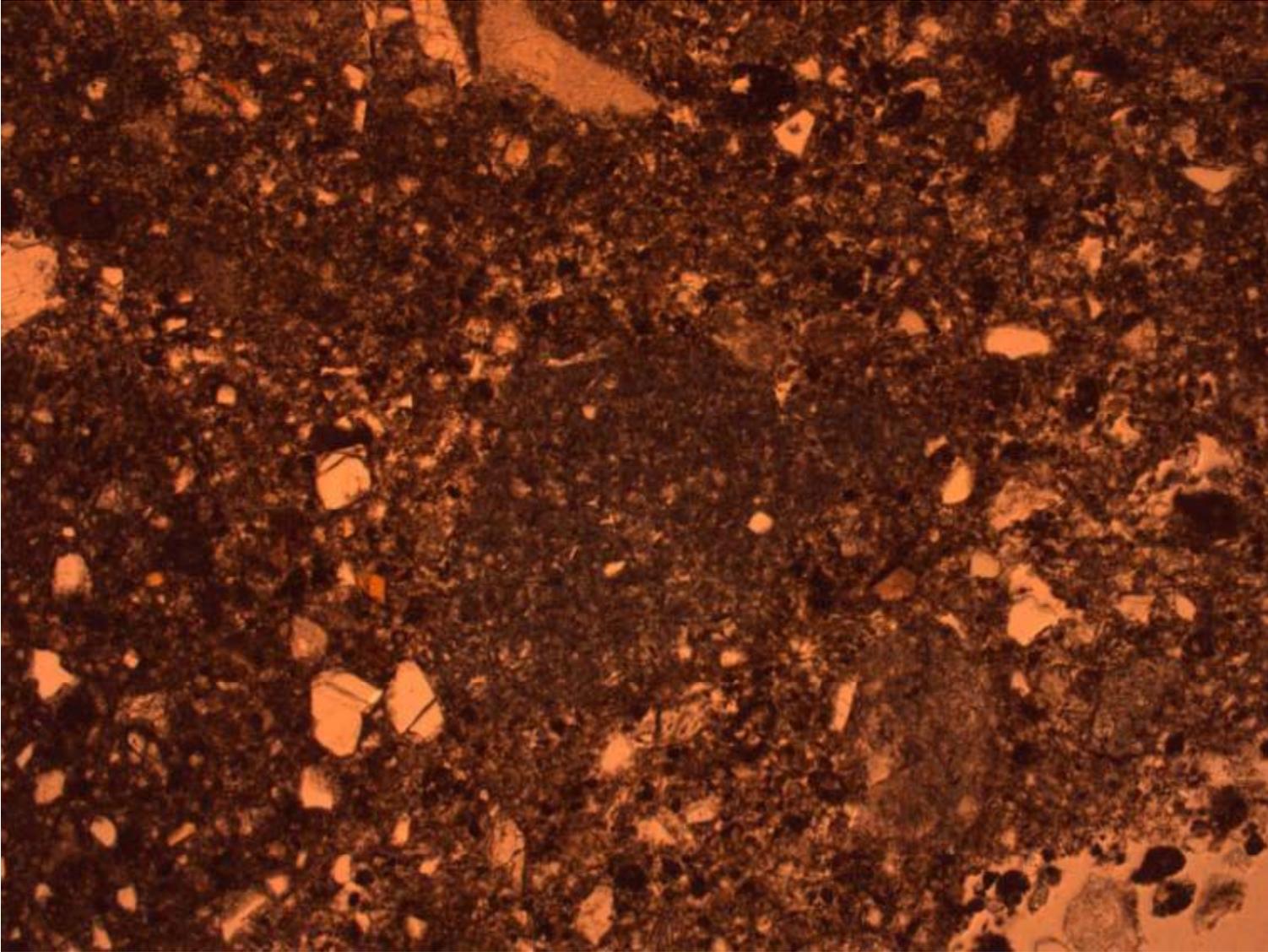
64002,6019 Area 7



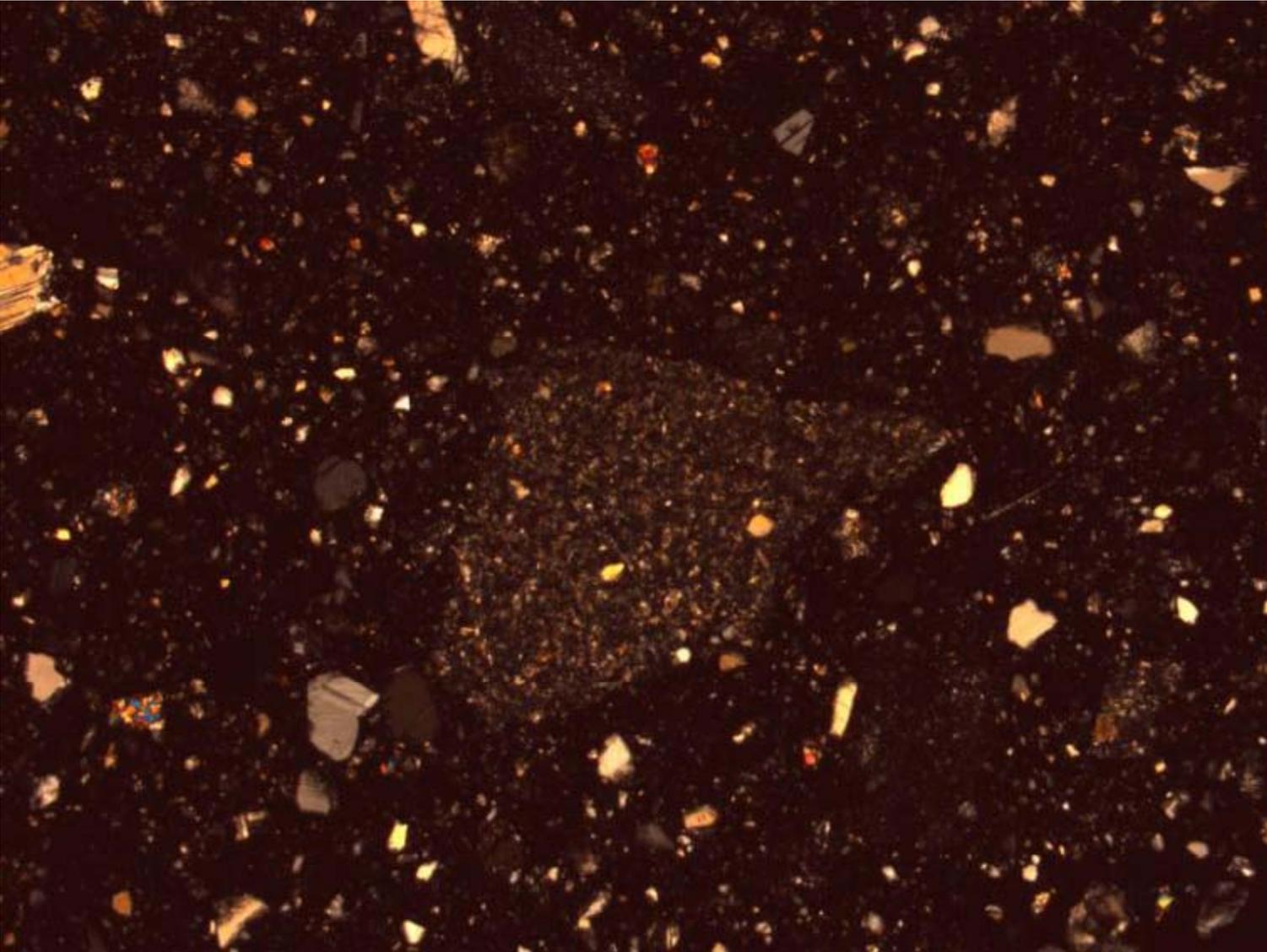
64002,6019 Area 8



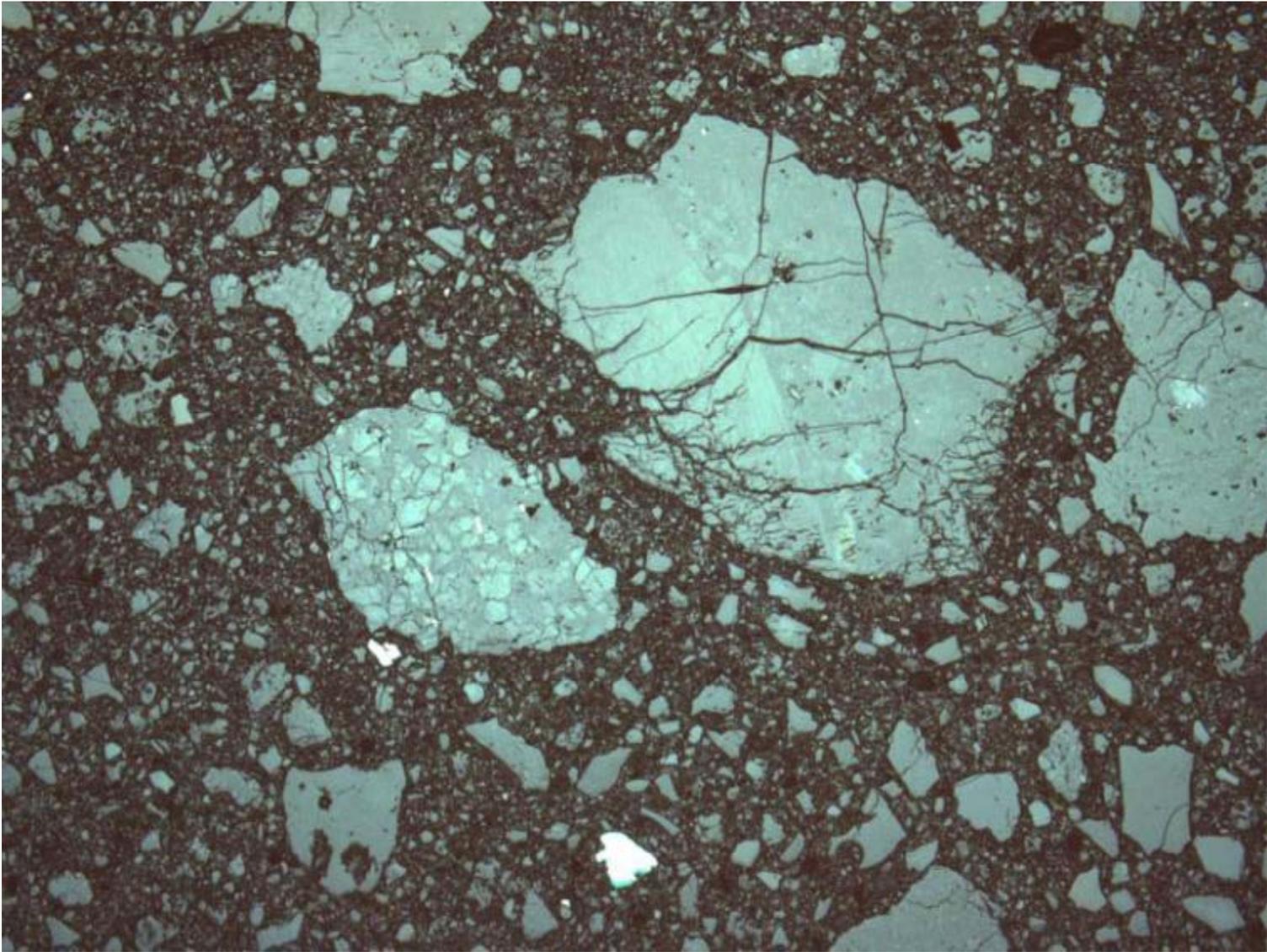
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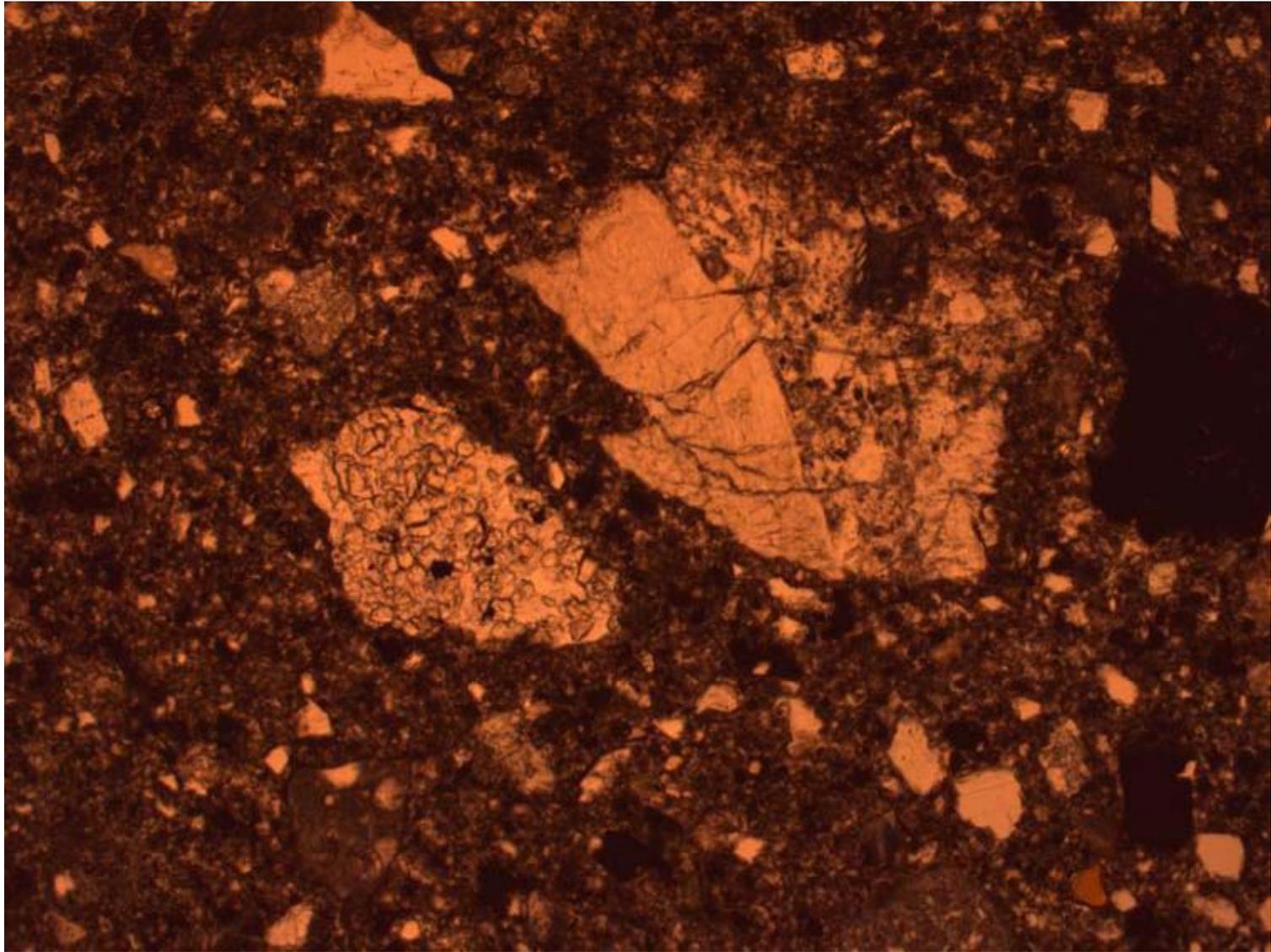
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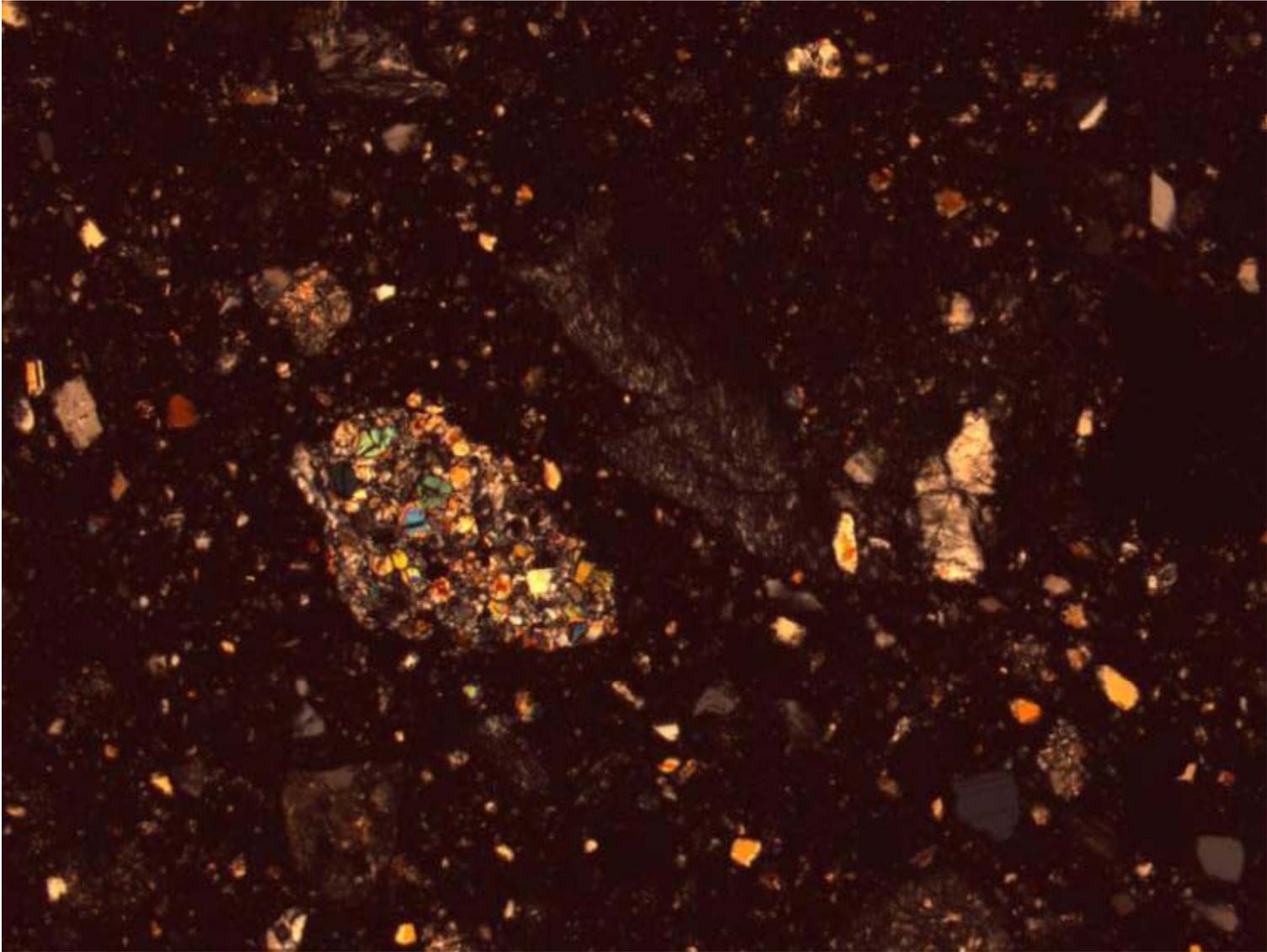
64002,6019 Area 9



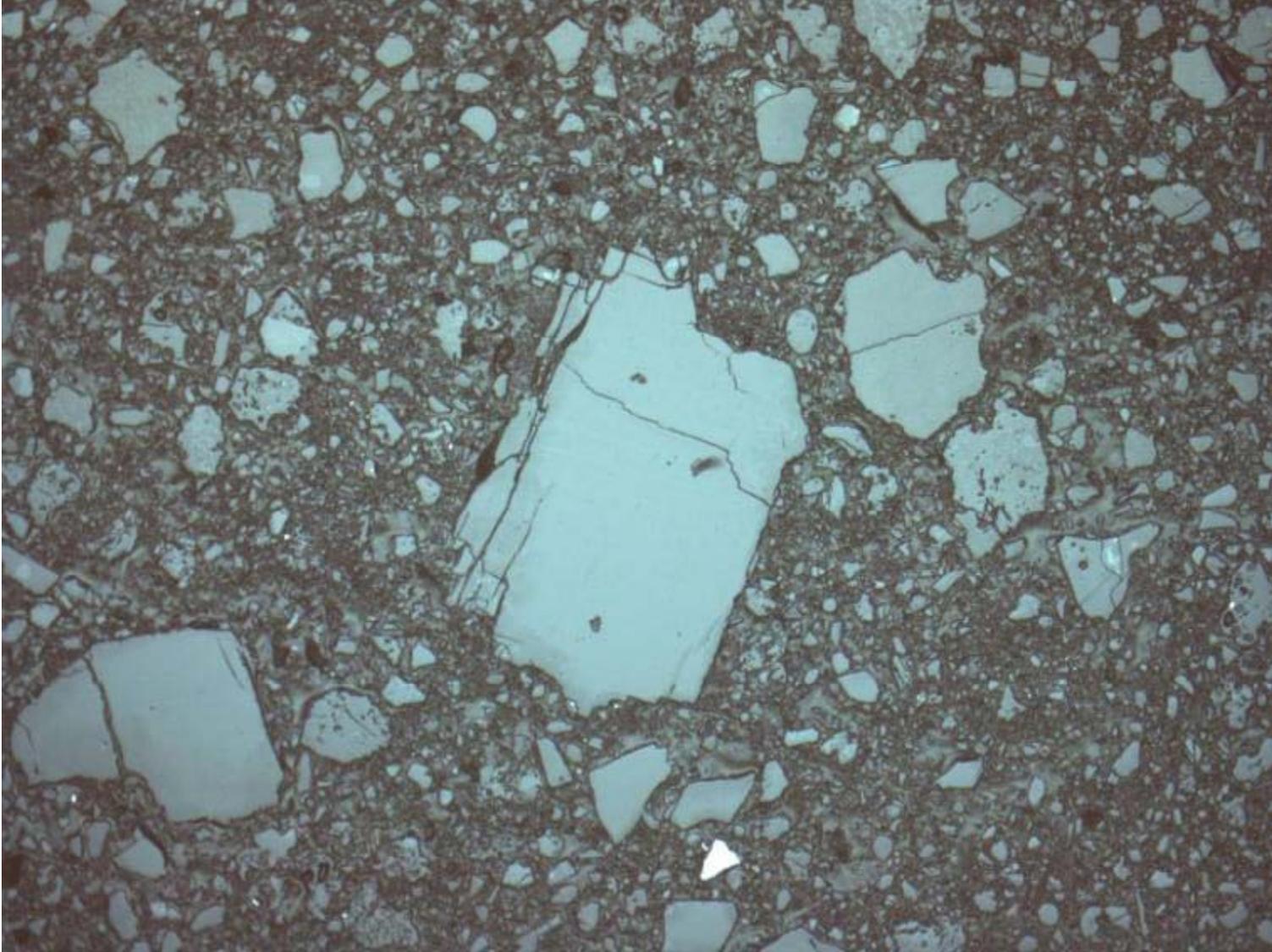
64002,6019 Area 9



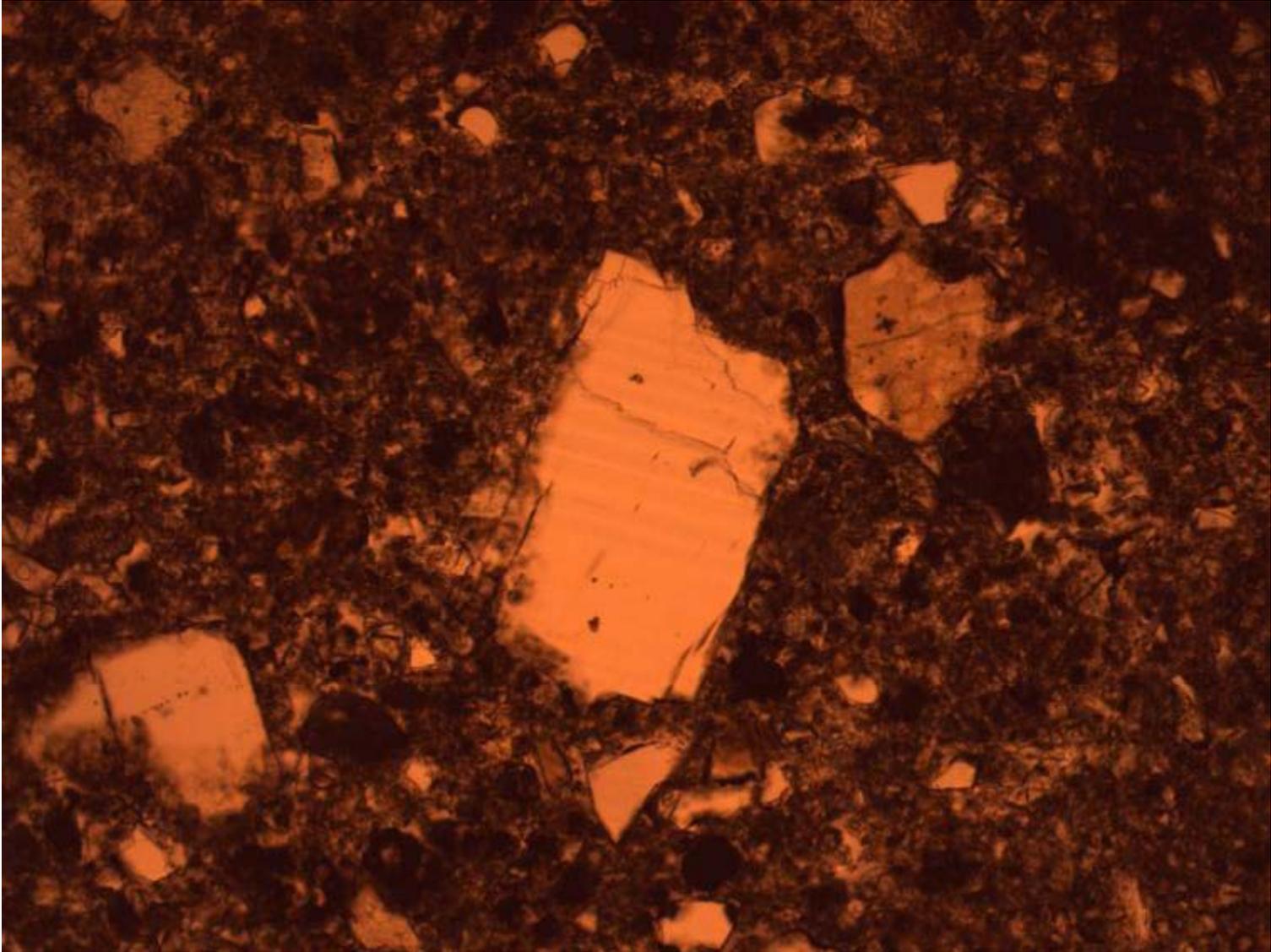
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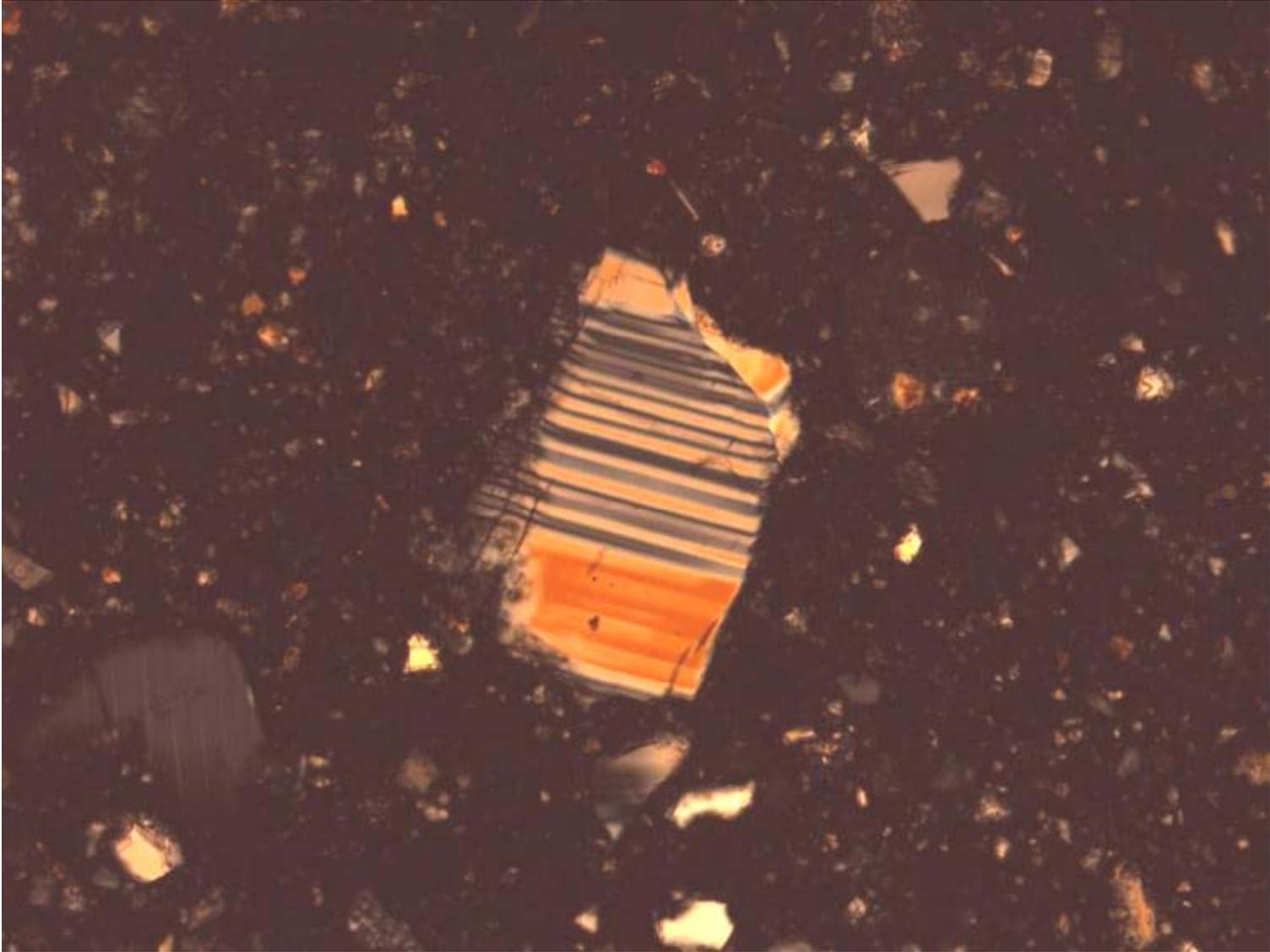
64002,6019 Area 10



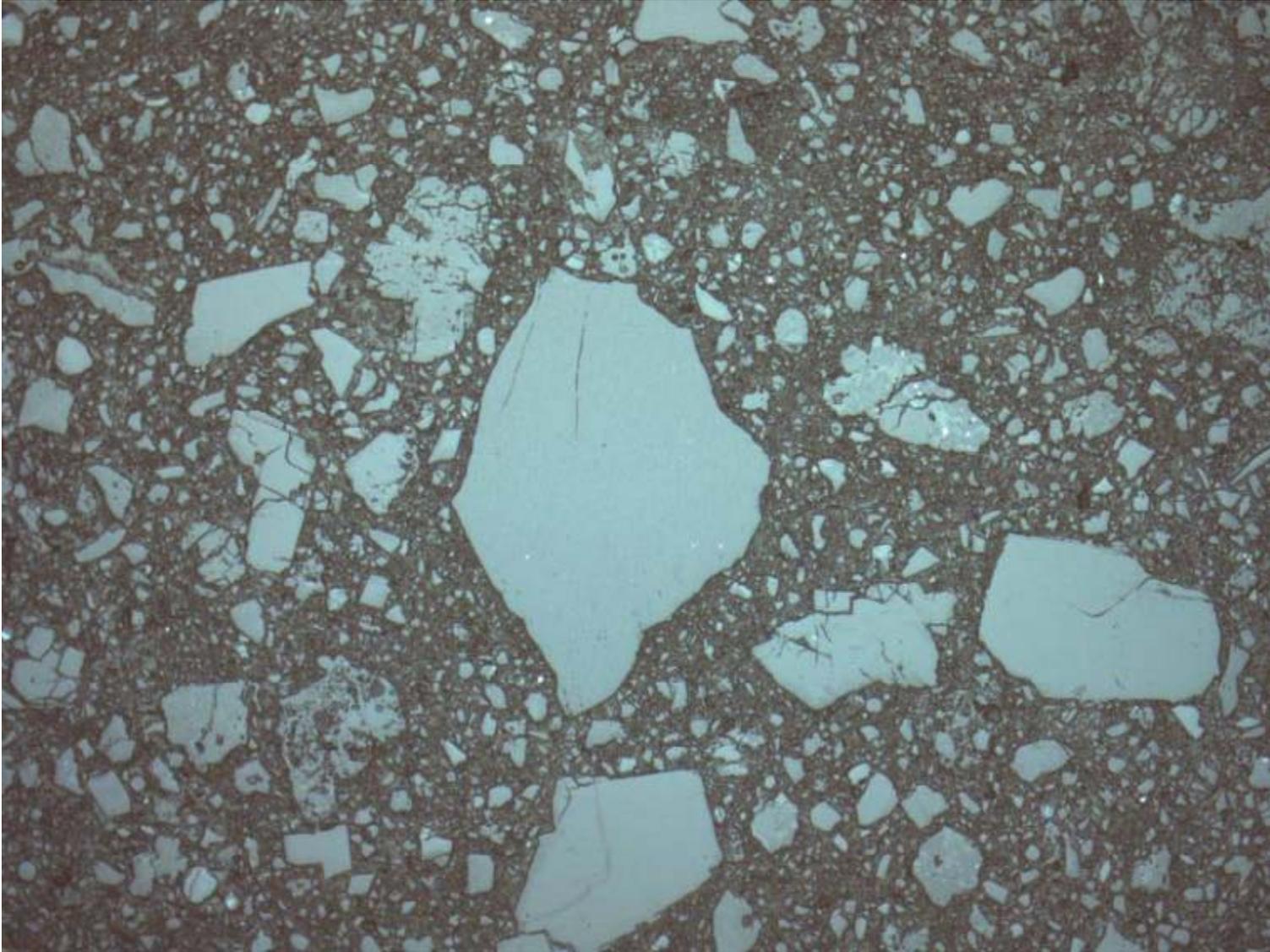
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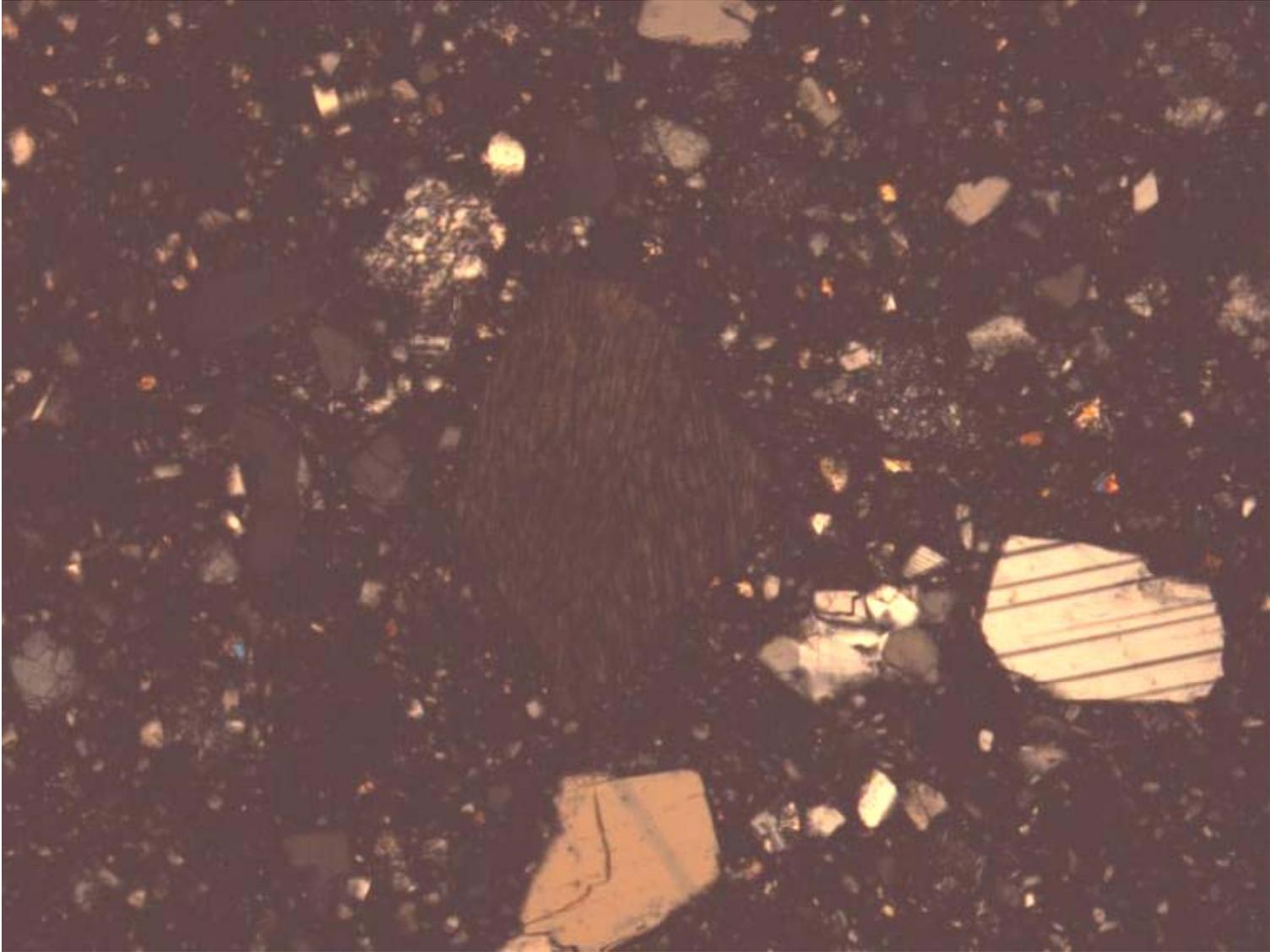
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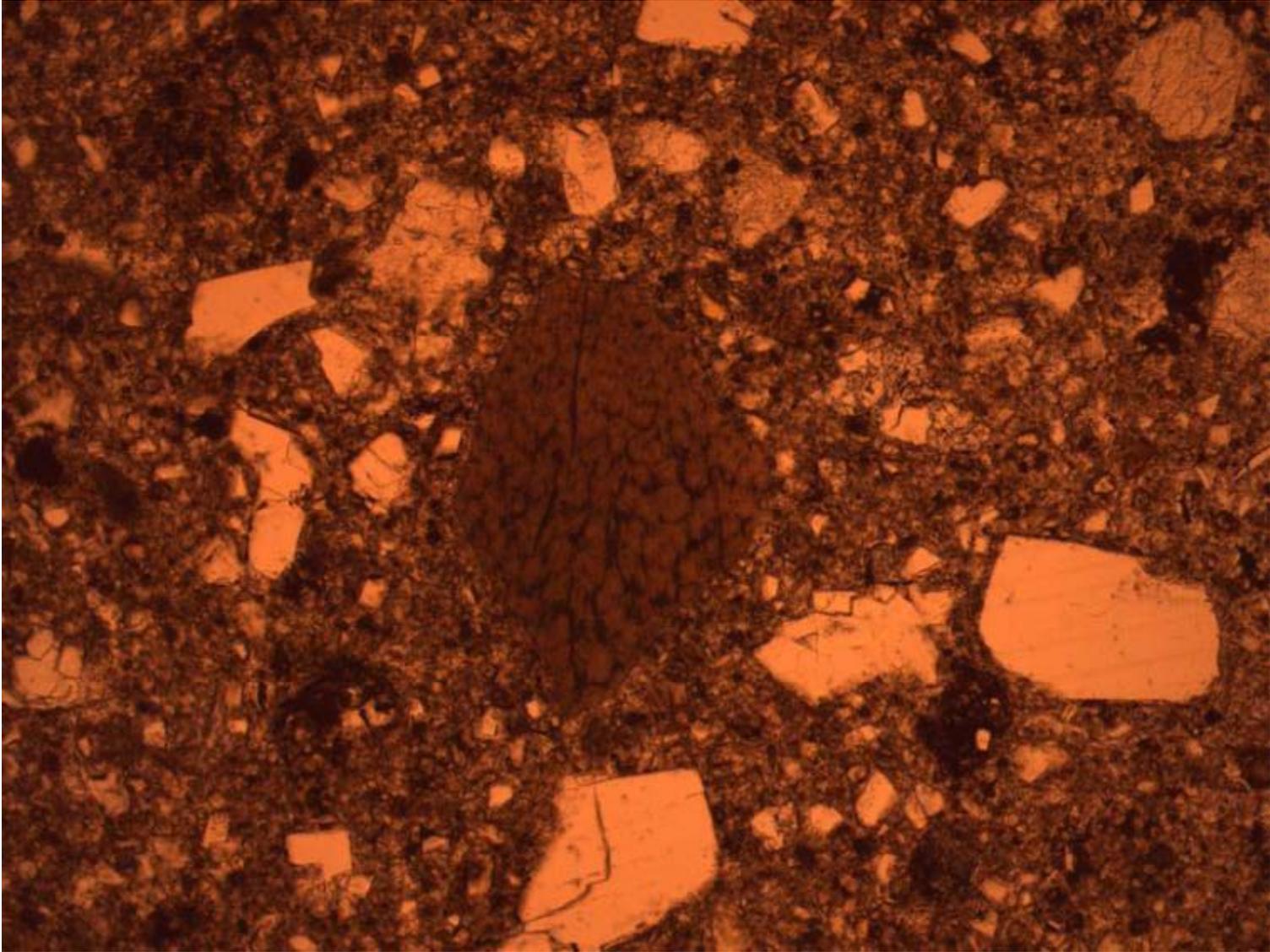
64002,6019 Area 11



64002,6019 Area 11

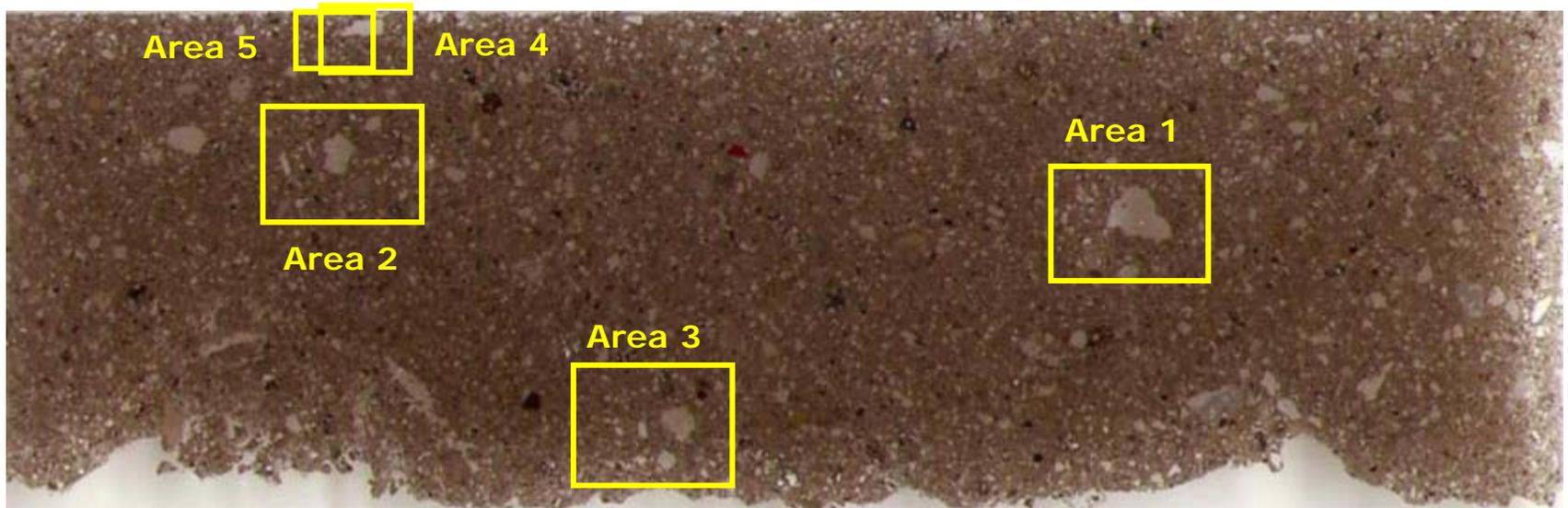


64002,6019 Area 11

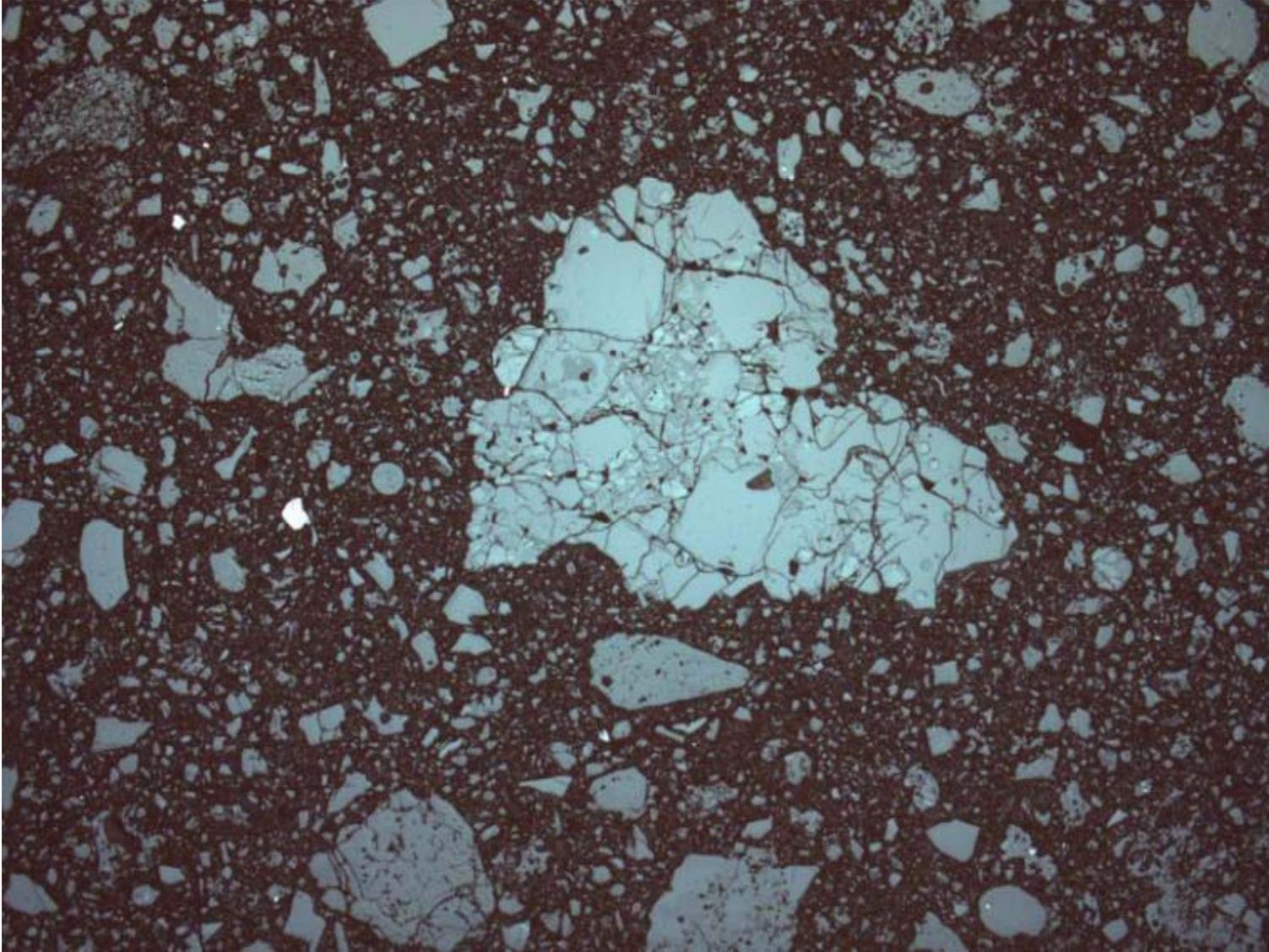


Areas photographed by optical microscope

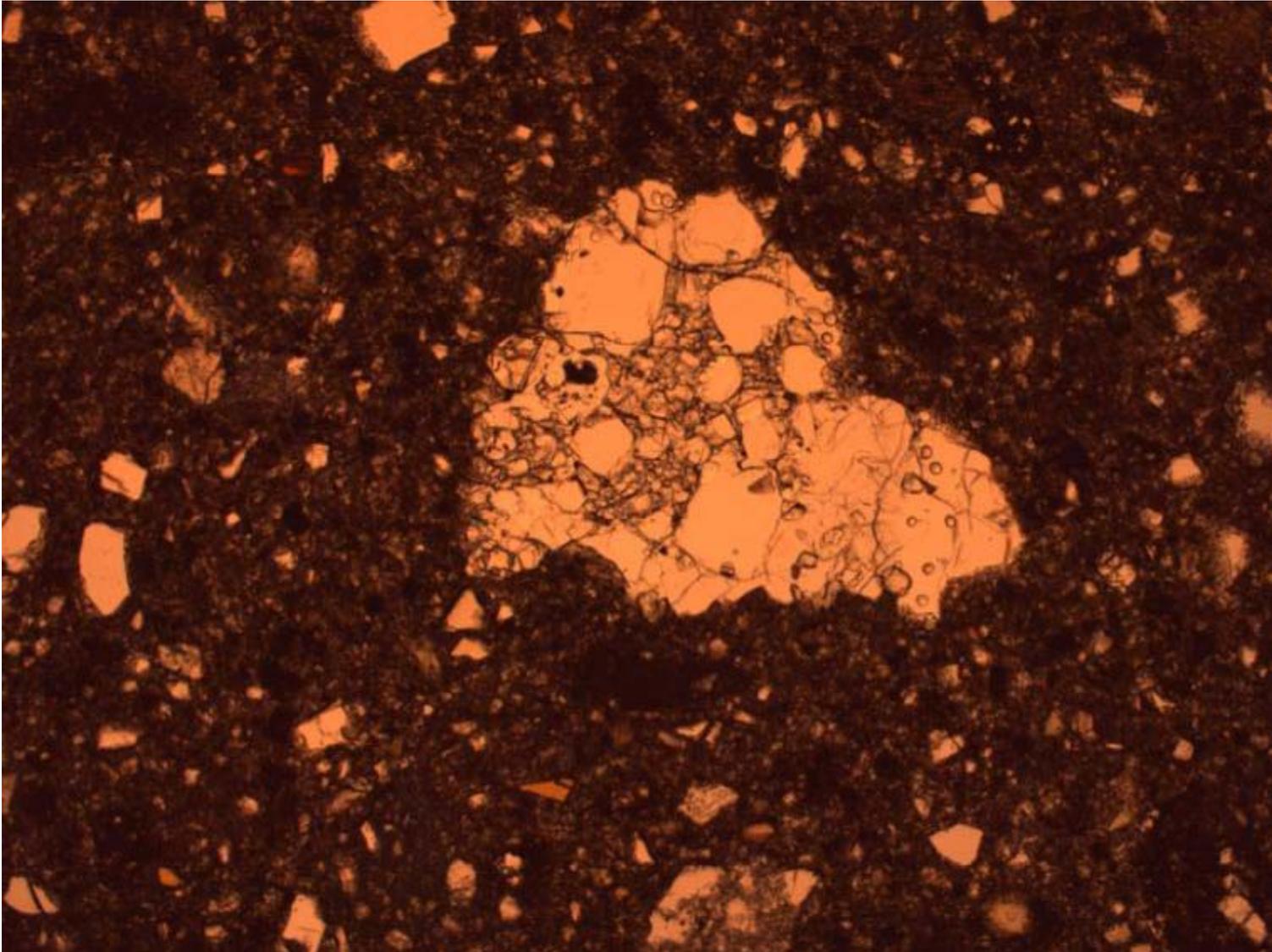
64001,6031



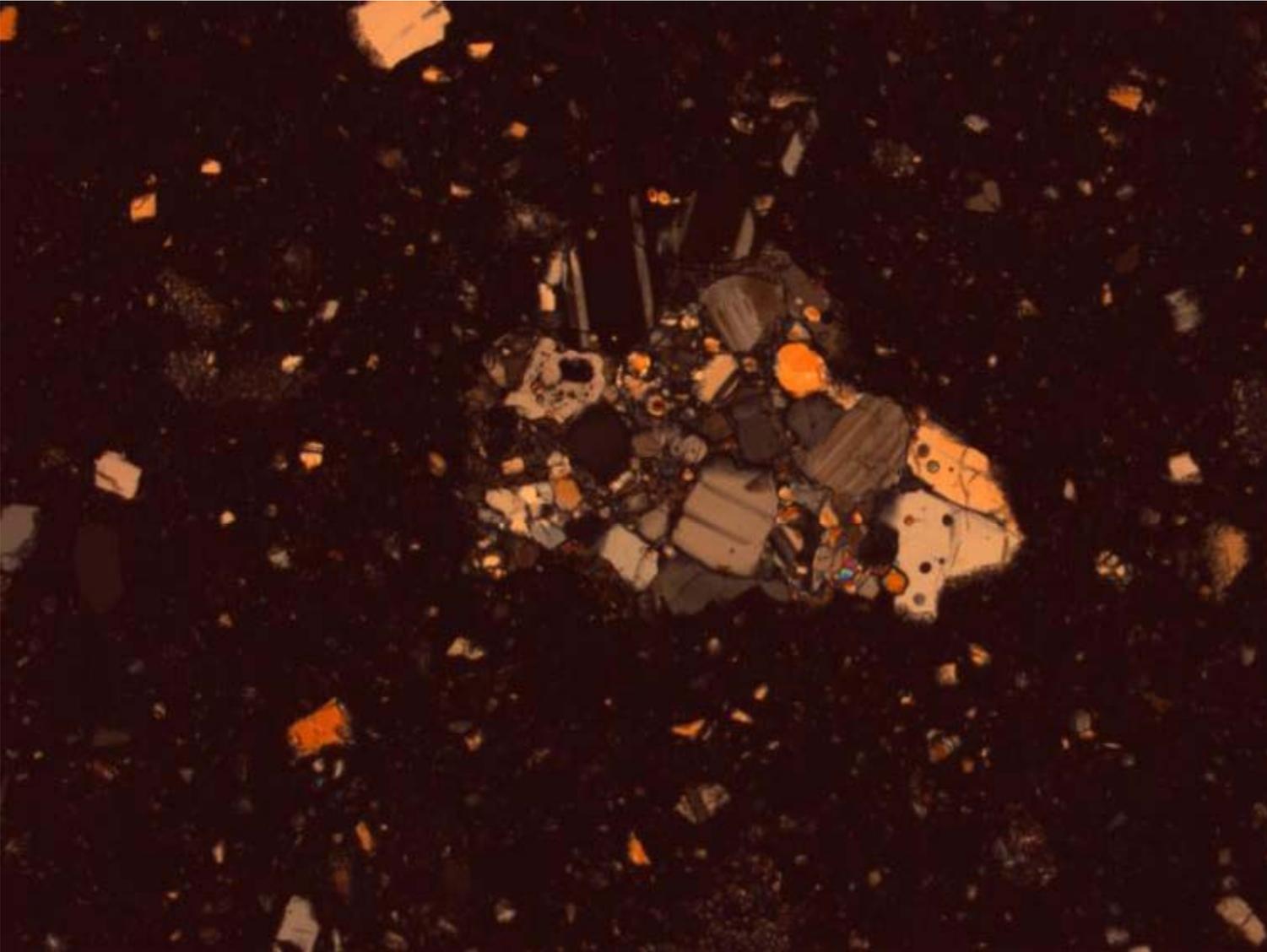
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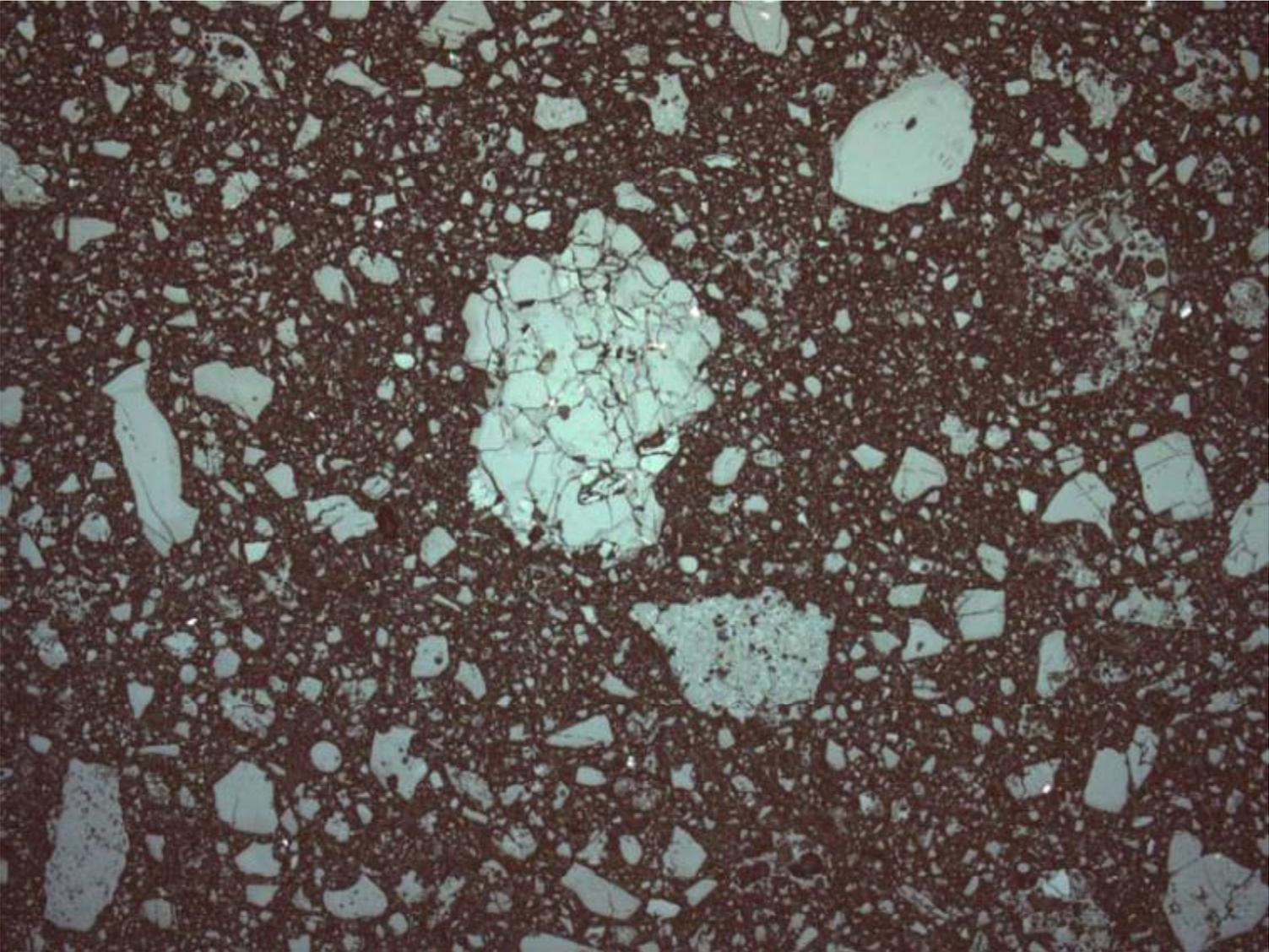
64001,6031 Area 1



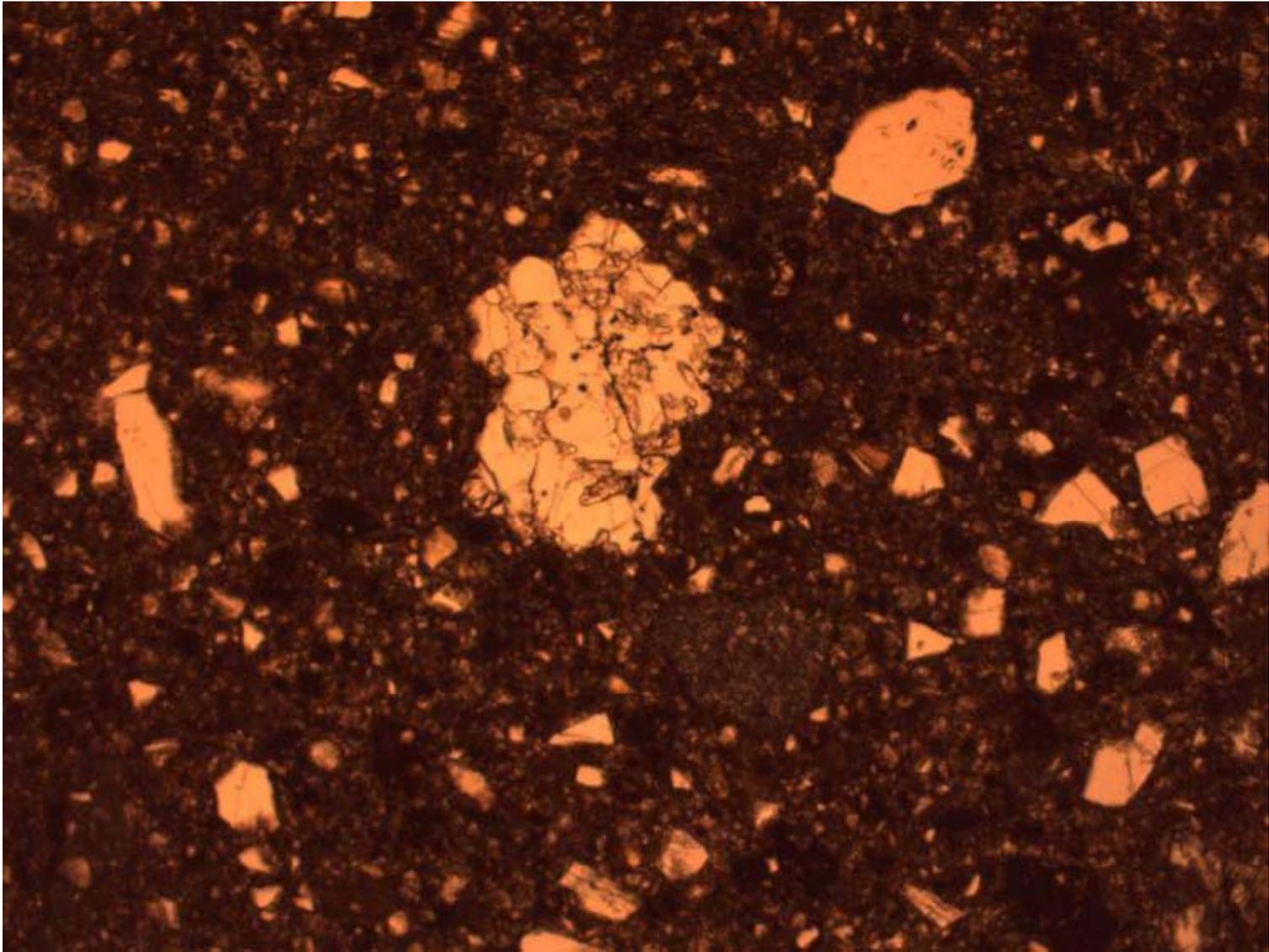
64001,6031 Area 2



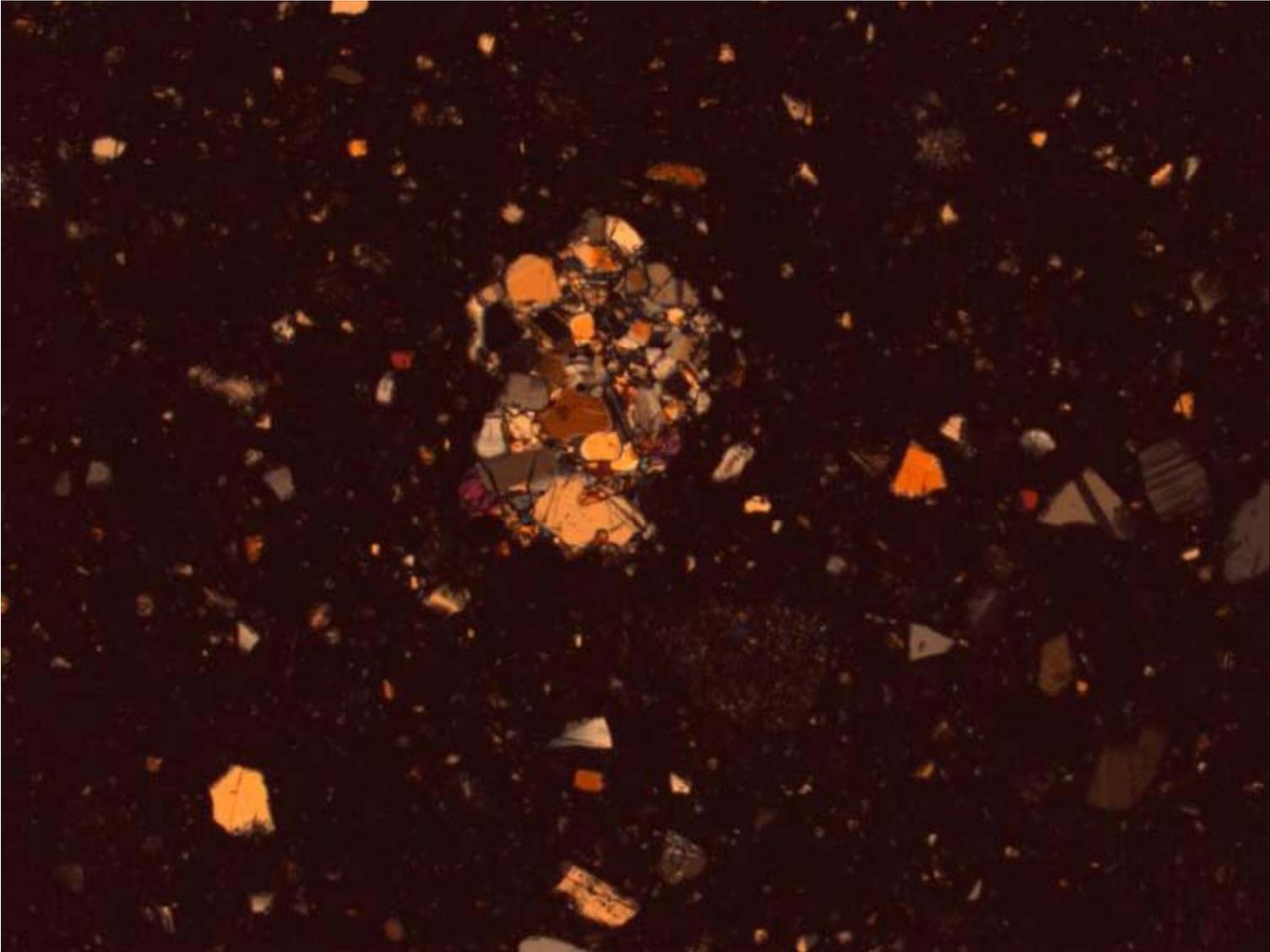
64001,6031 Area 2



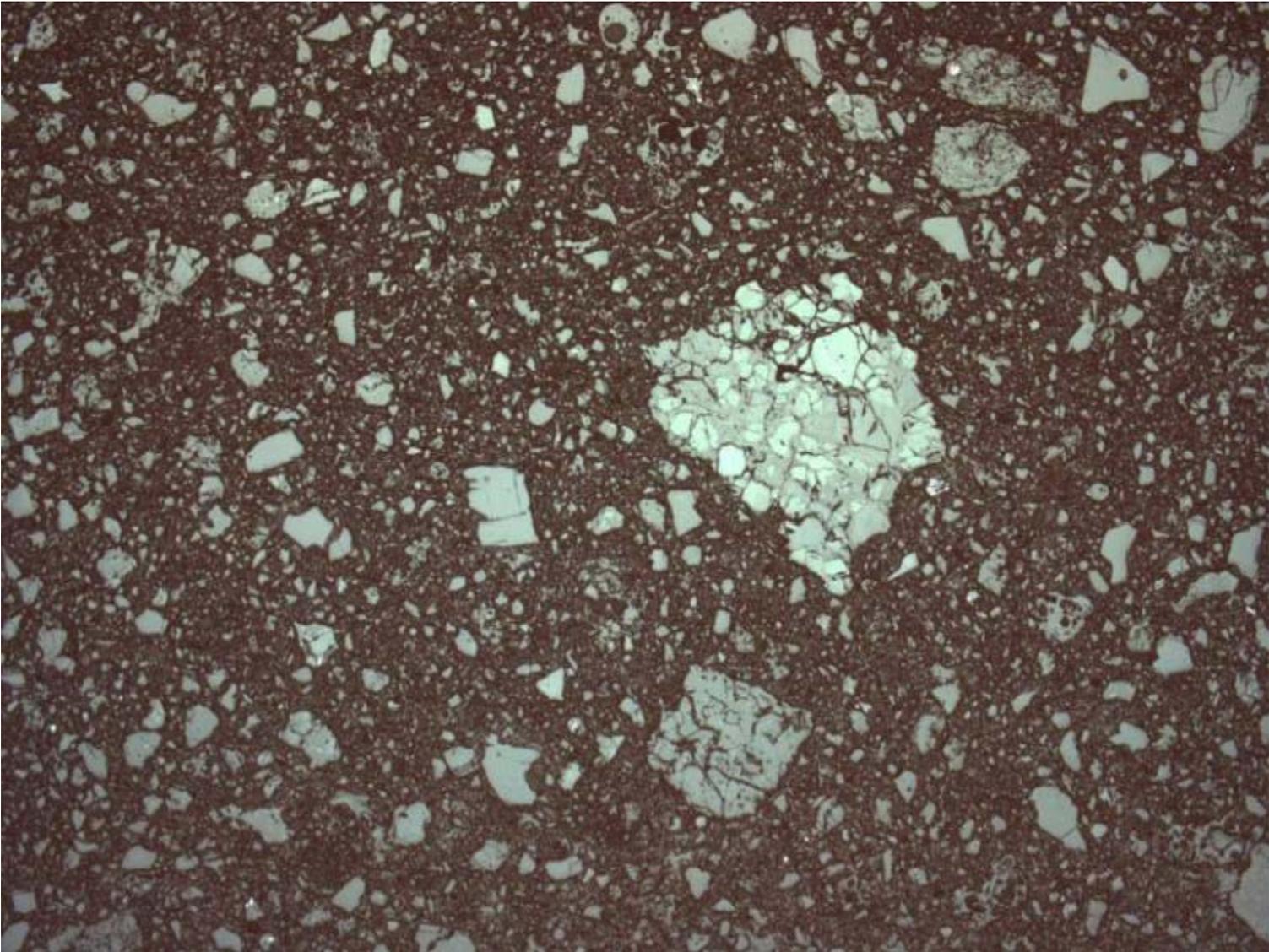
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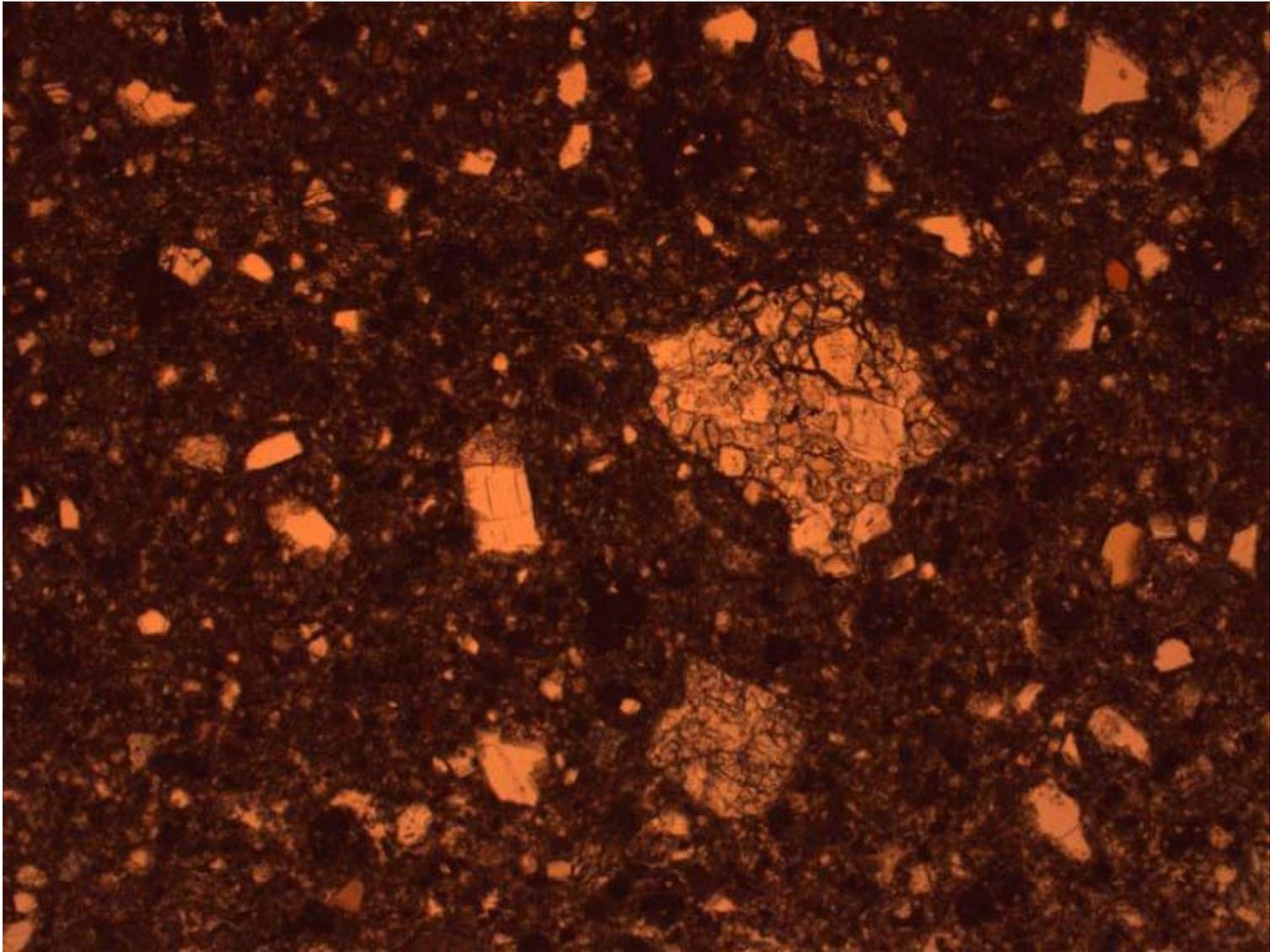
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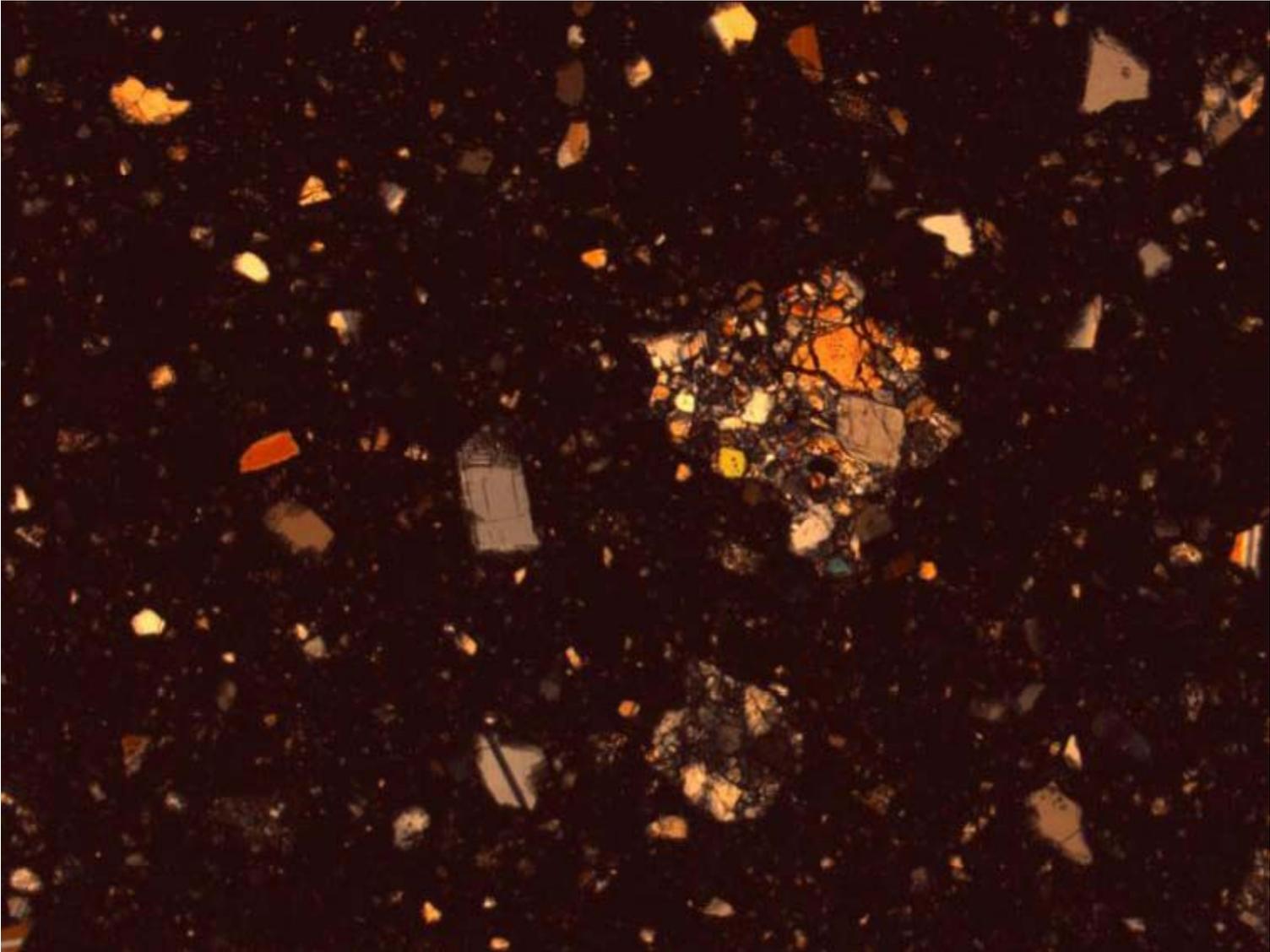
64001,6031 Area 3



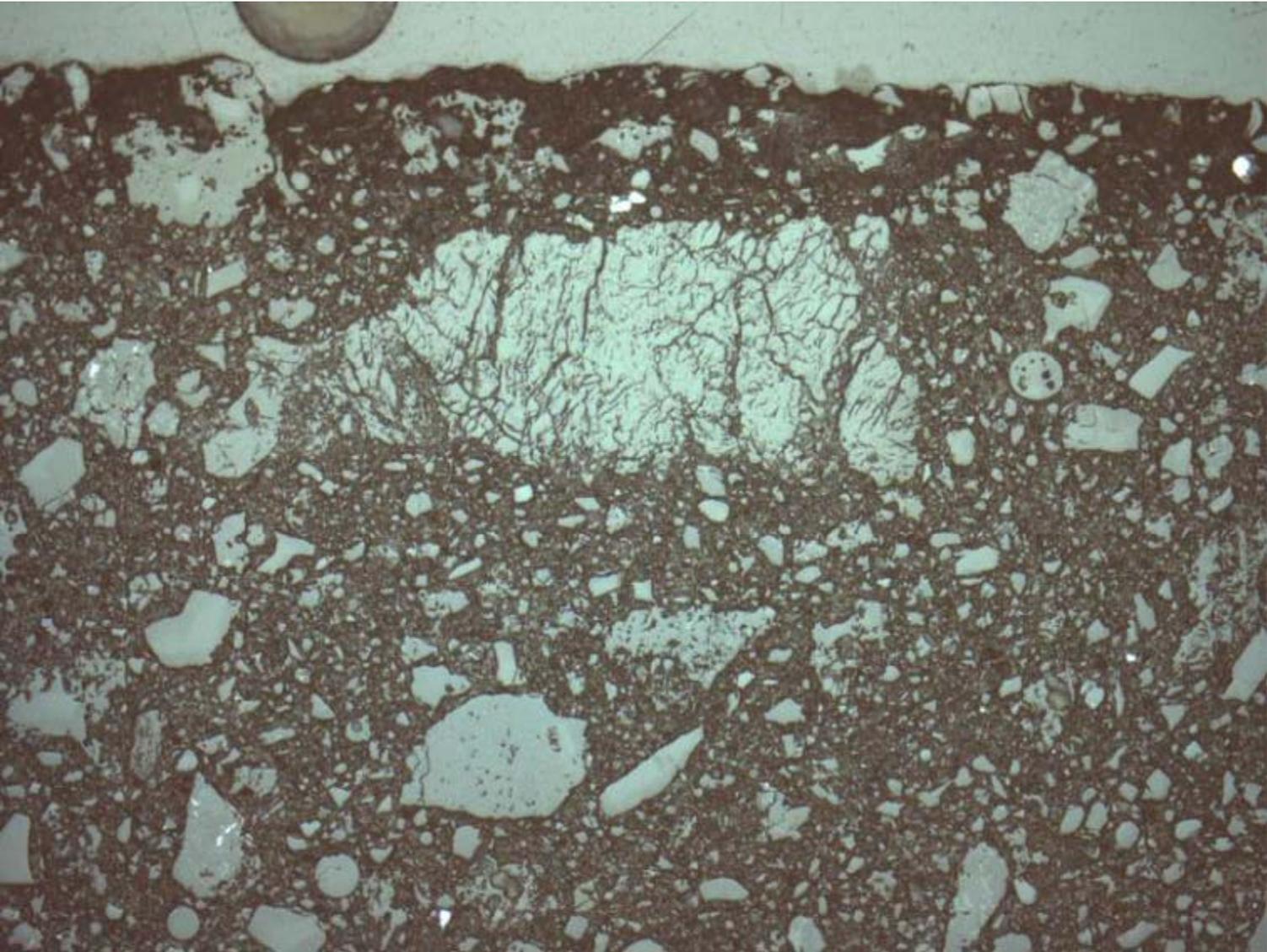
64001,6031 Area 3



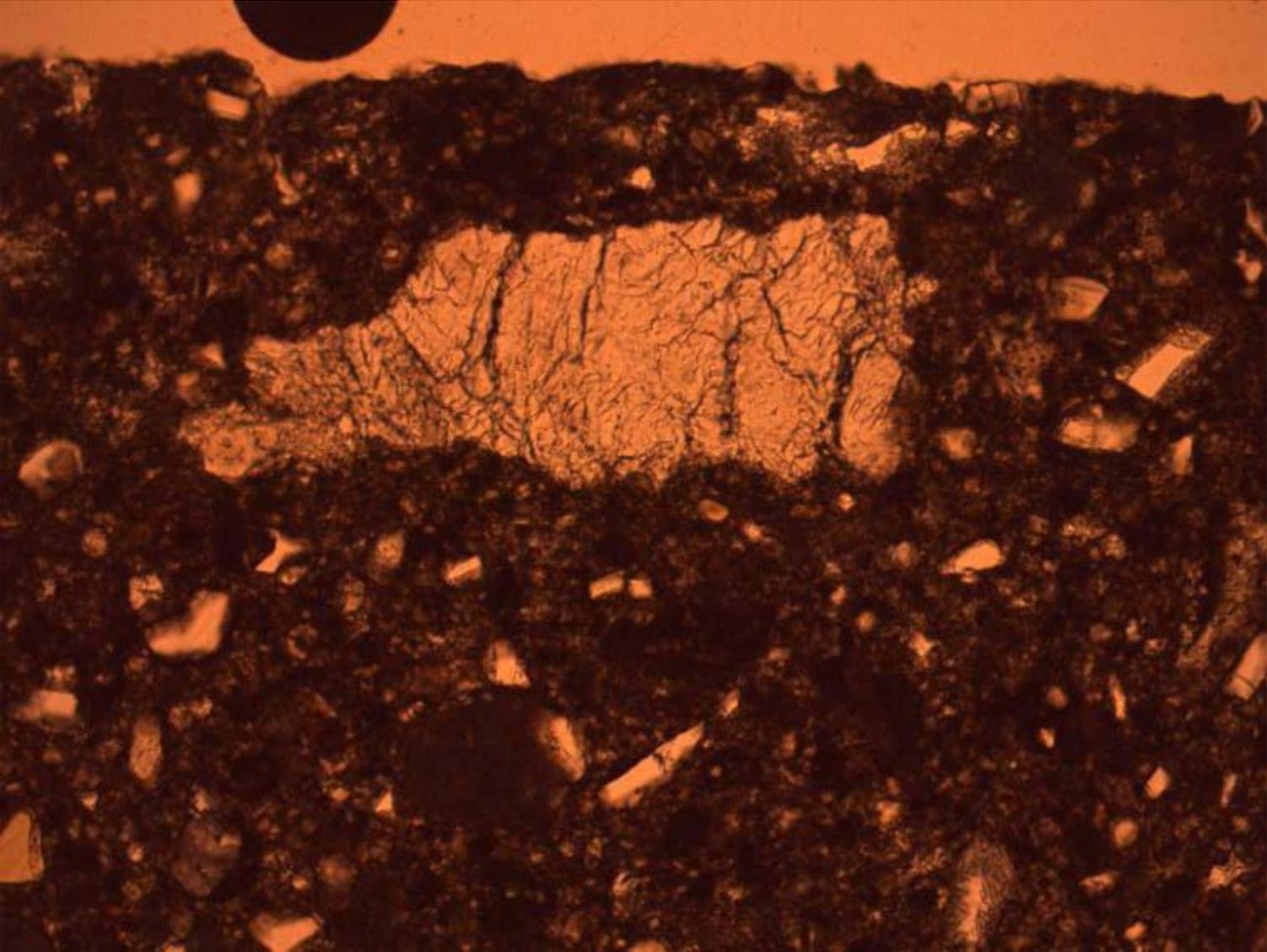
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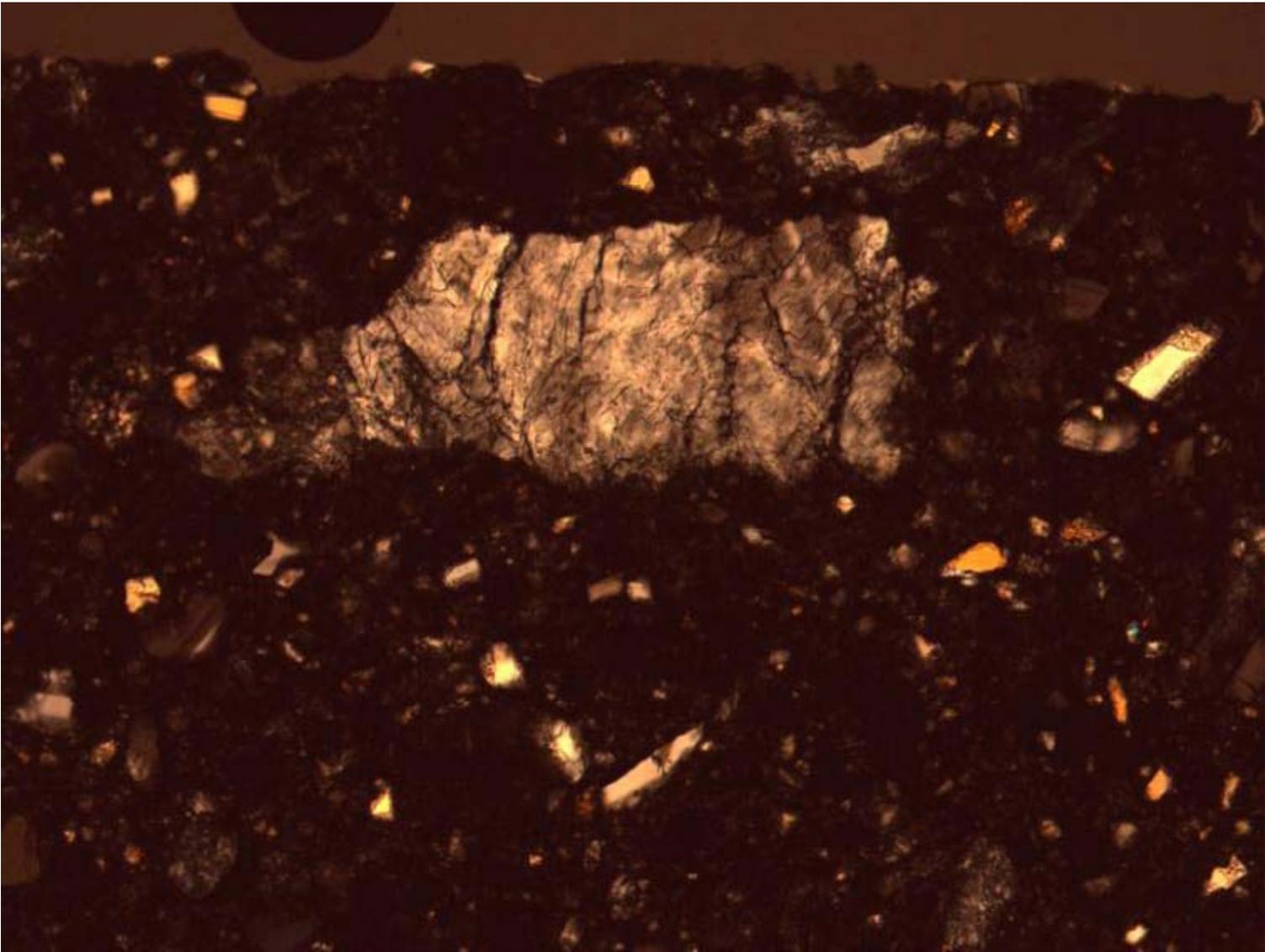
64001,6031 Area 4



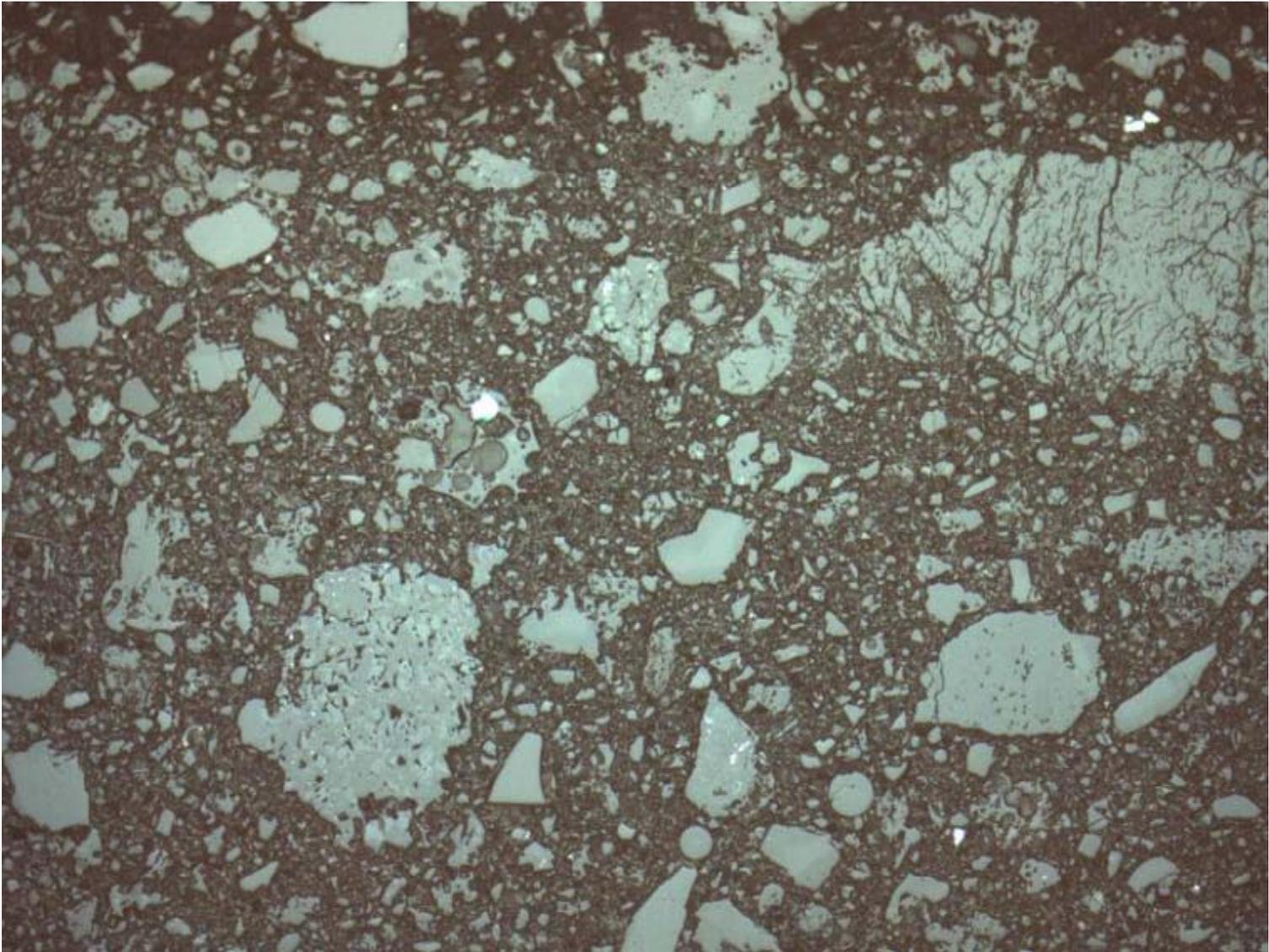
64001,6031 Area 4



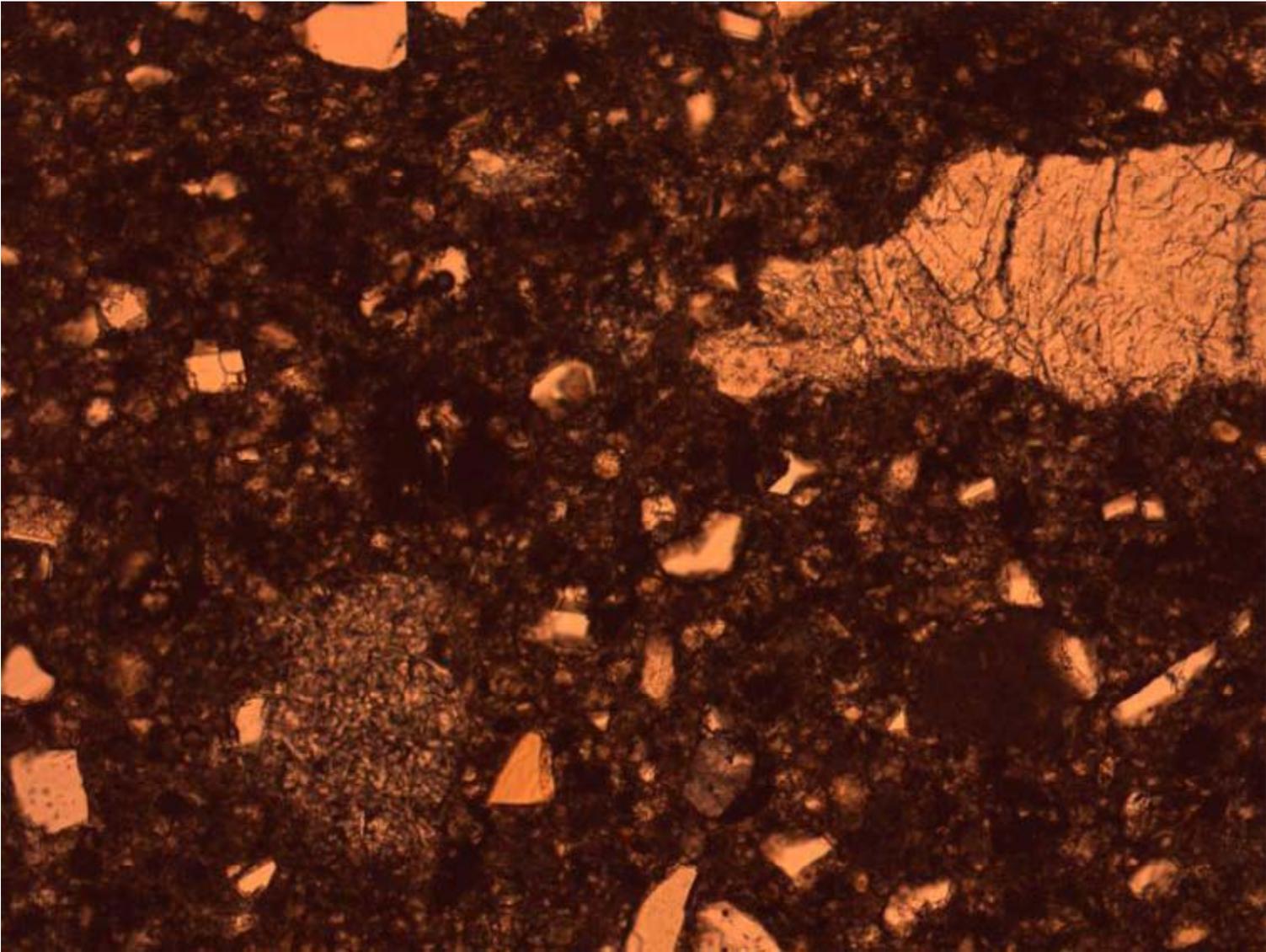
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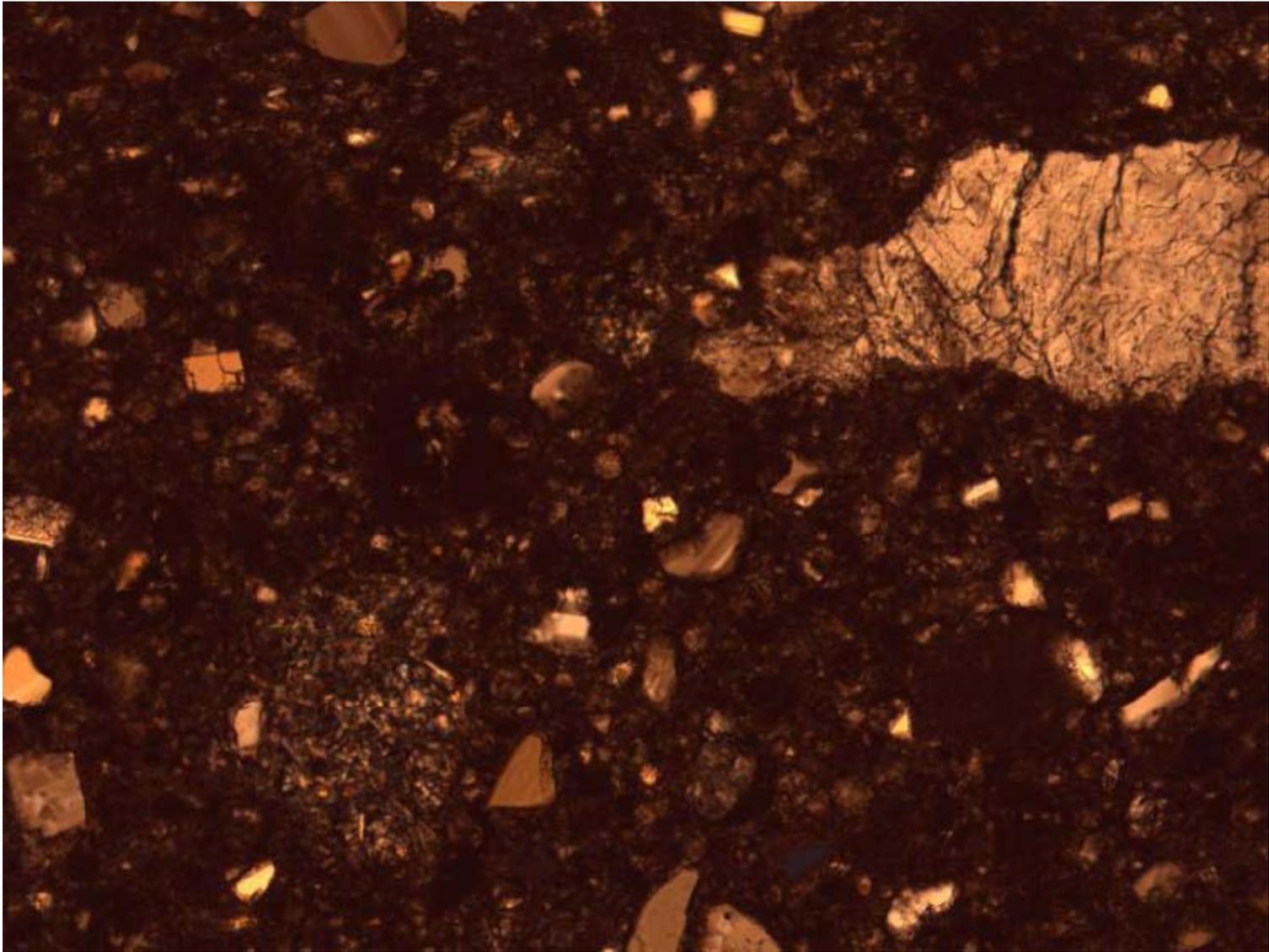
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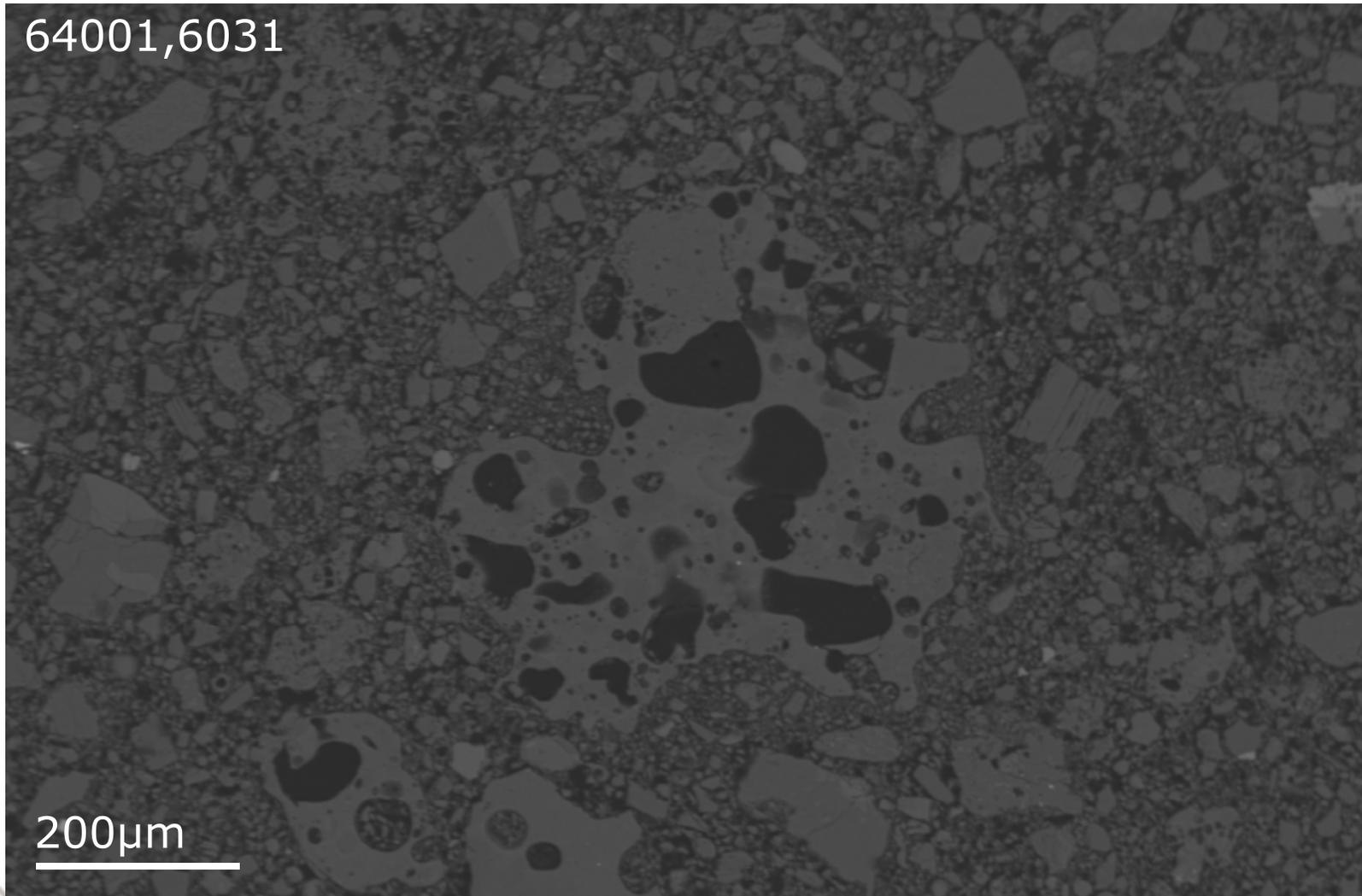
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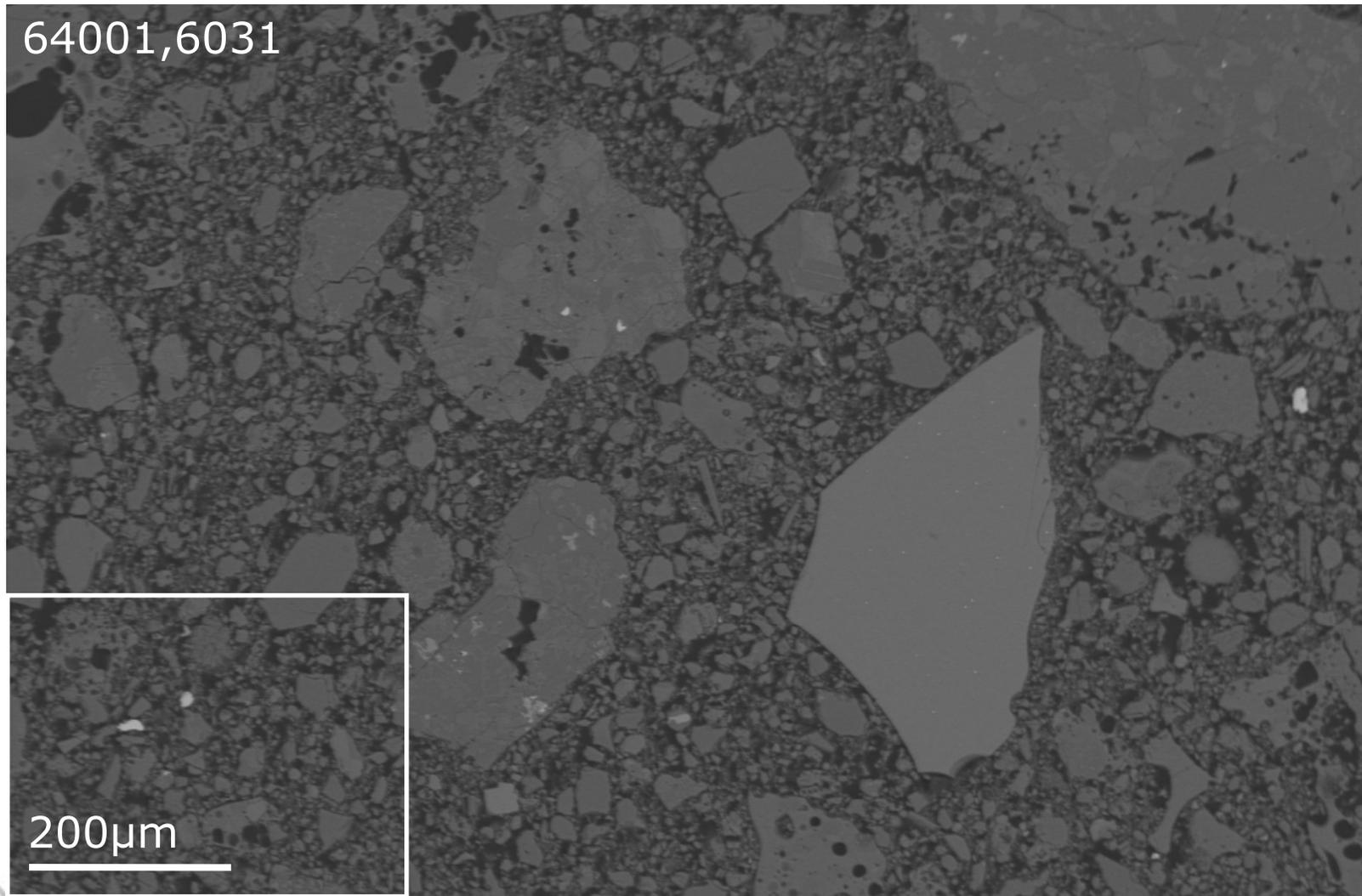
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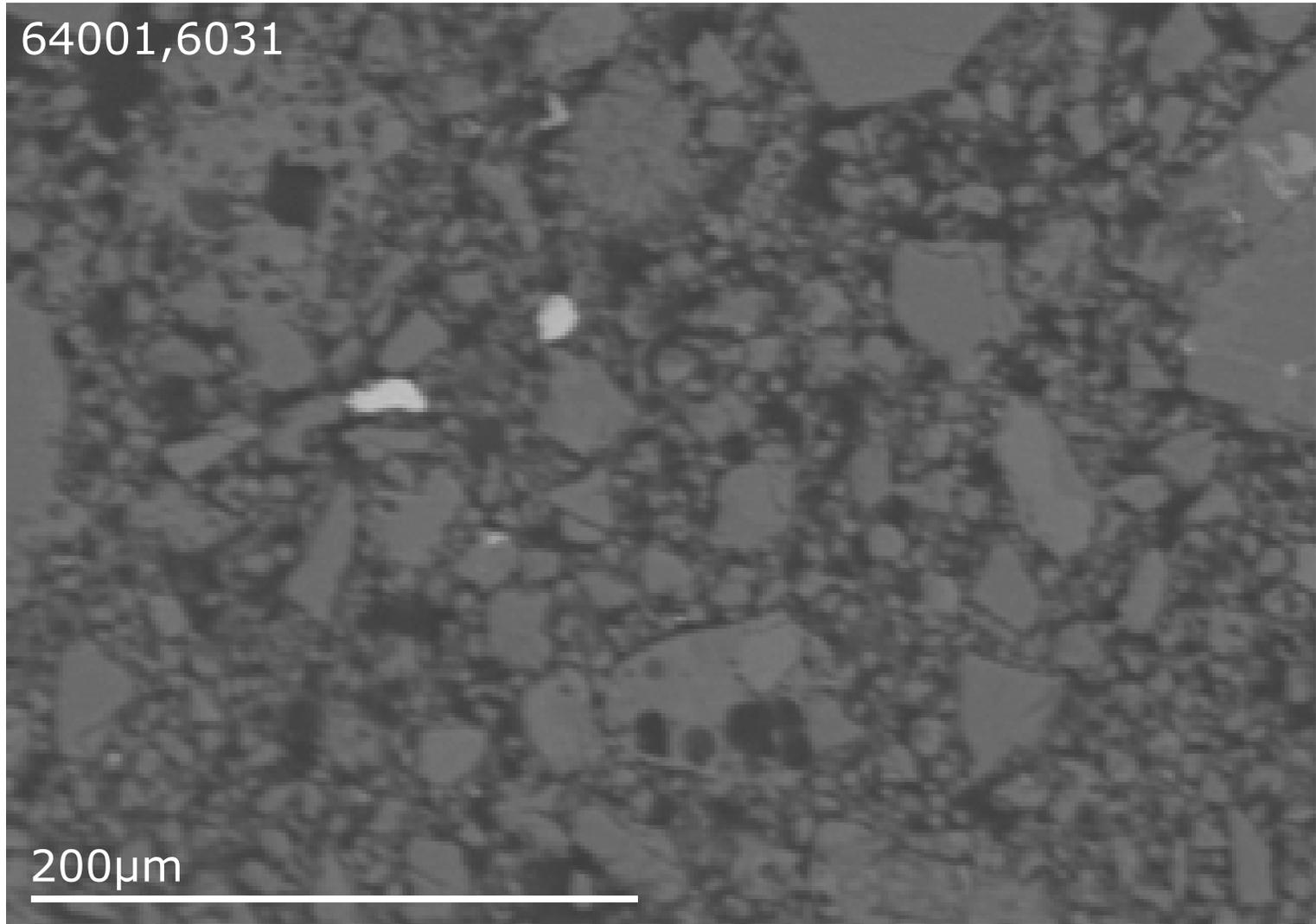
QEMSCAN[®] Backscattered Electron Photomicrograph



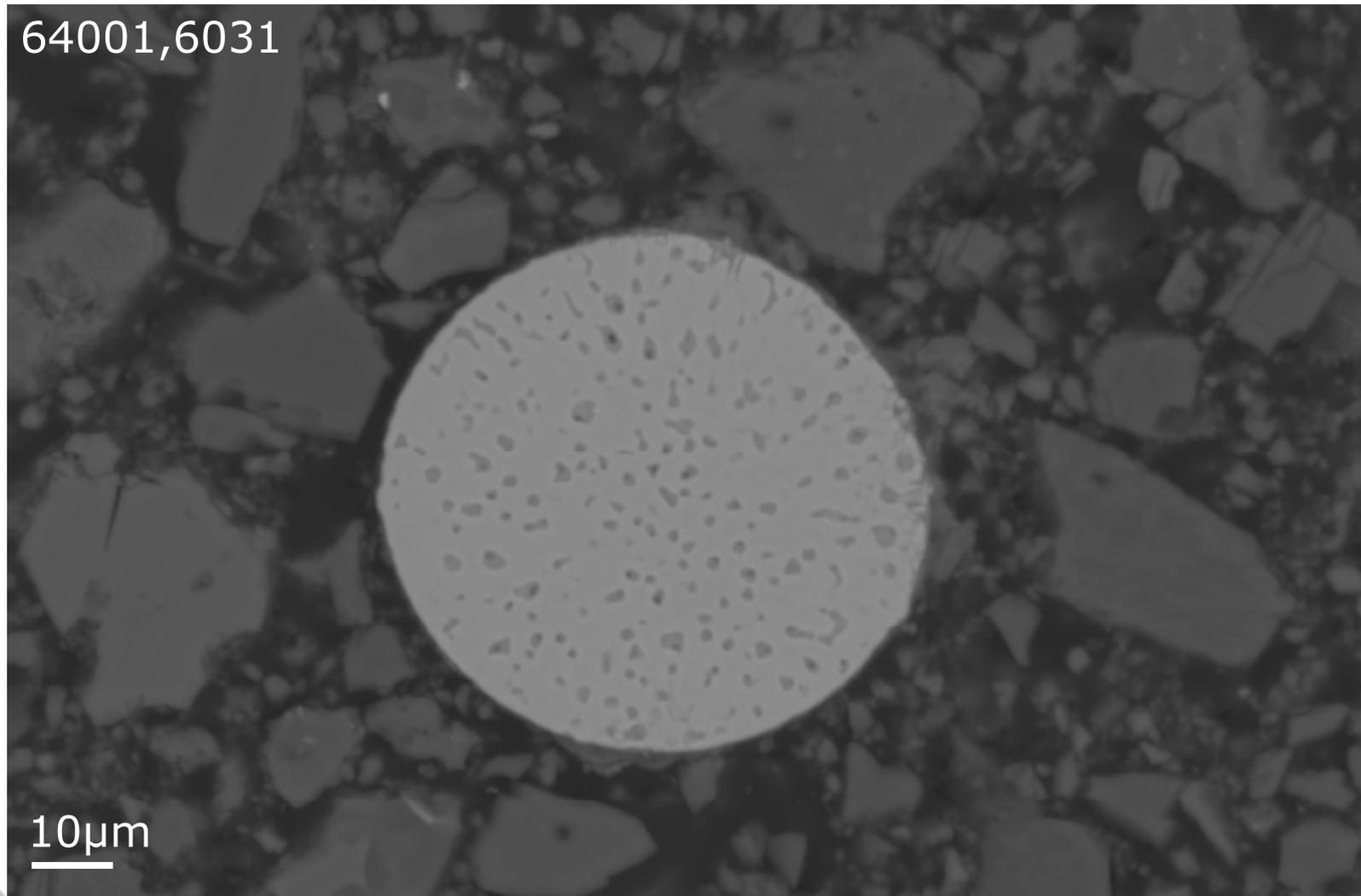
QEMSCAN[®] Backscattered Electron Photomicrograph



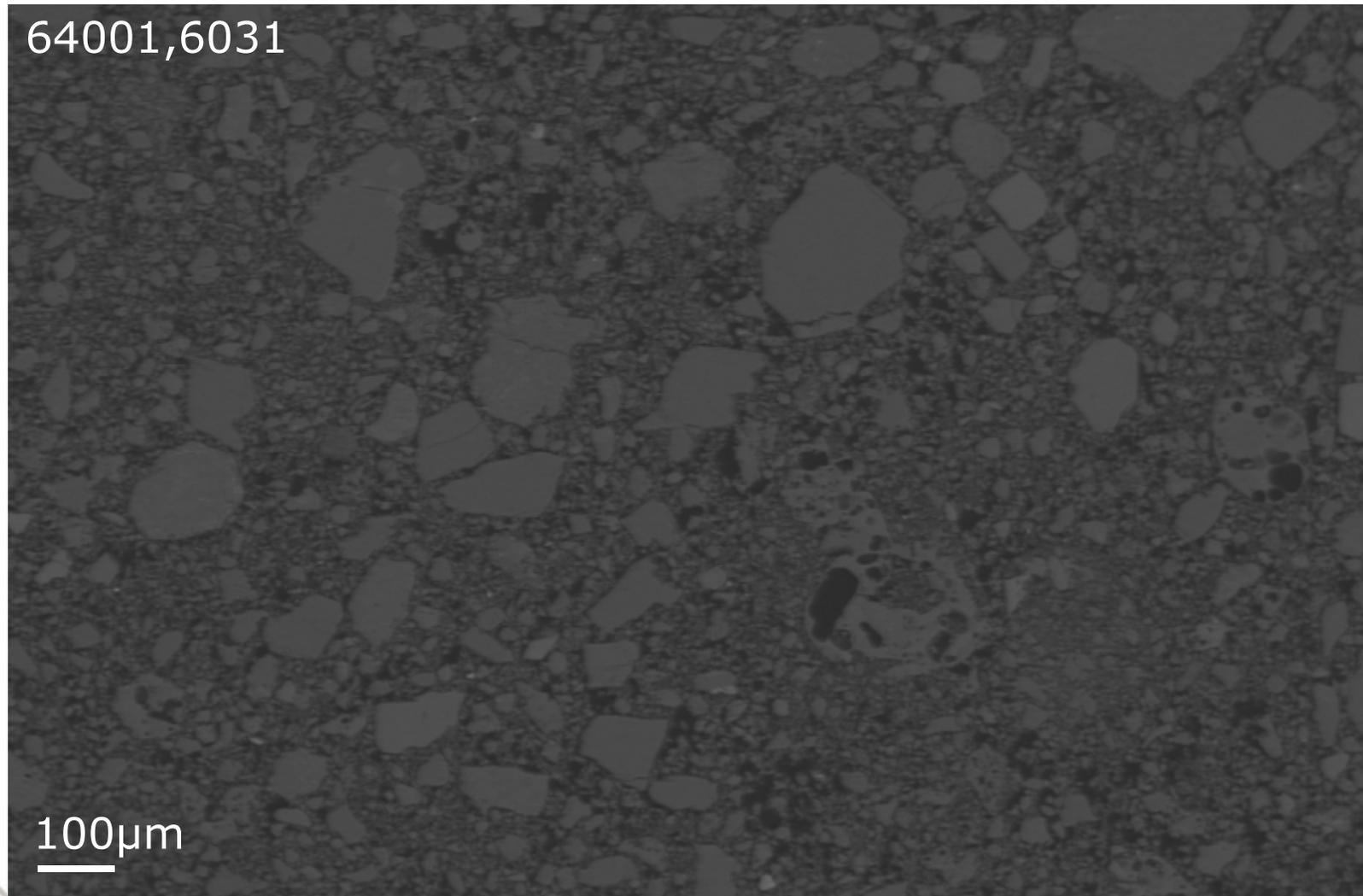
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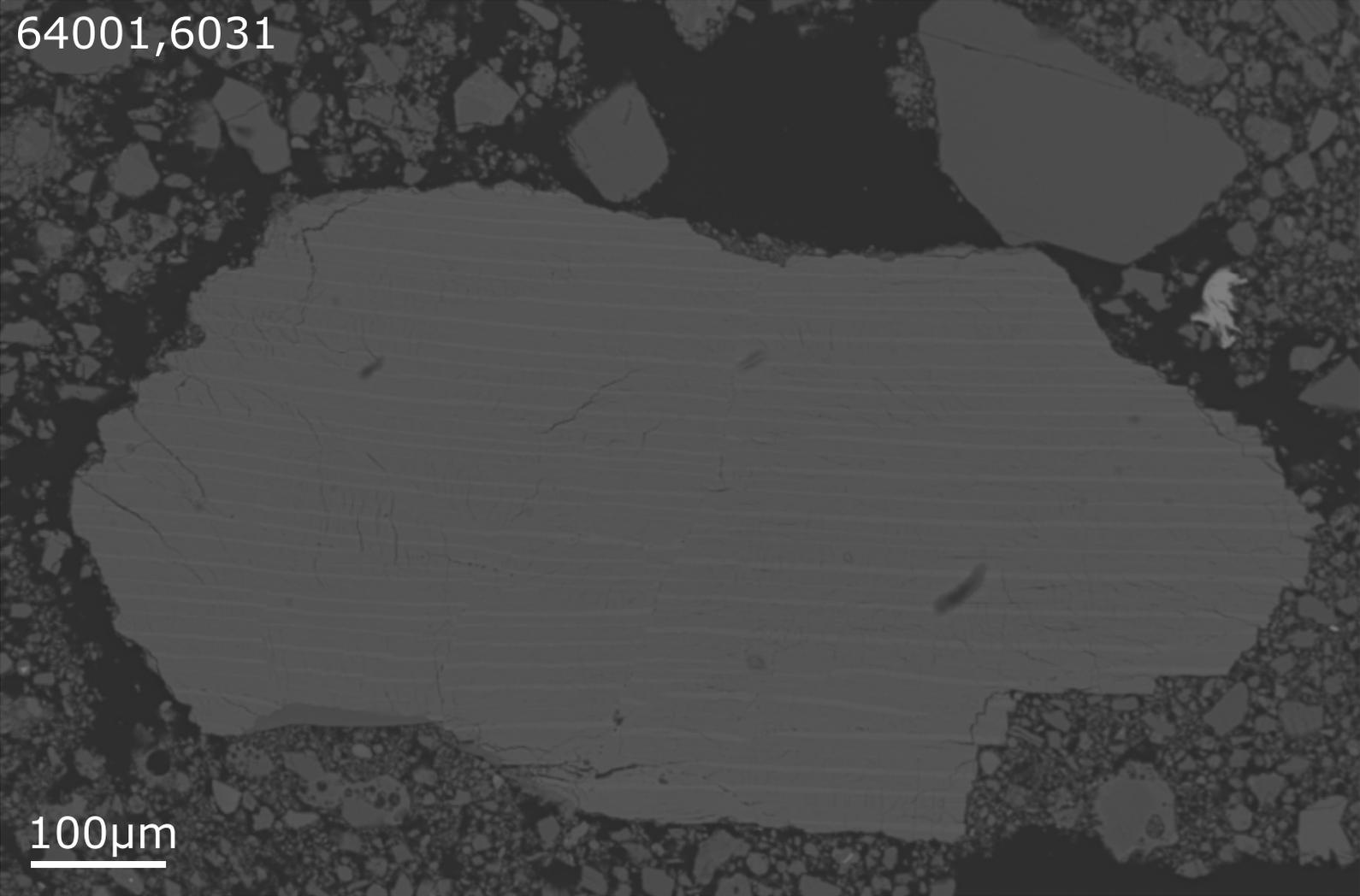
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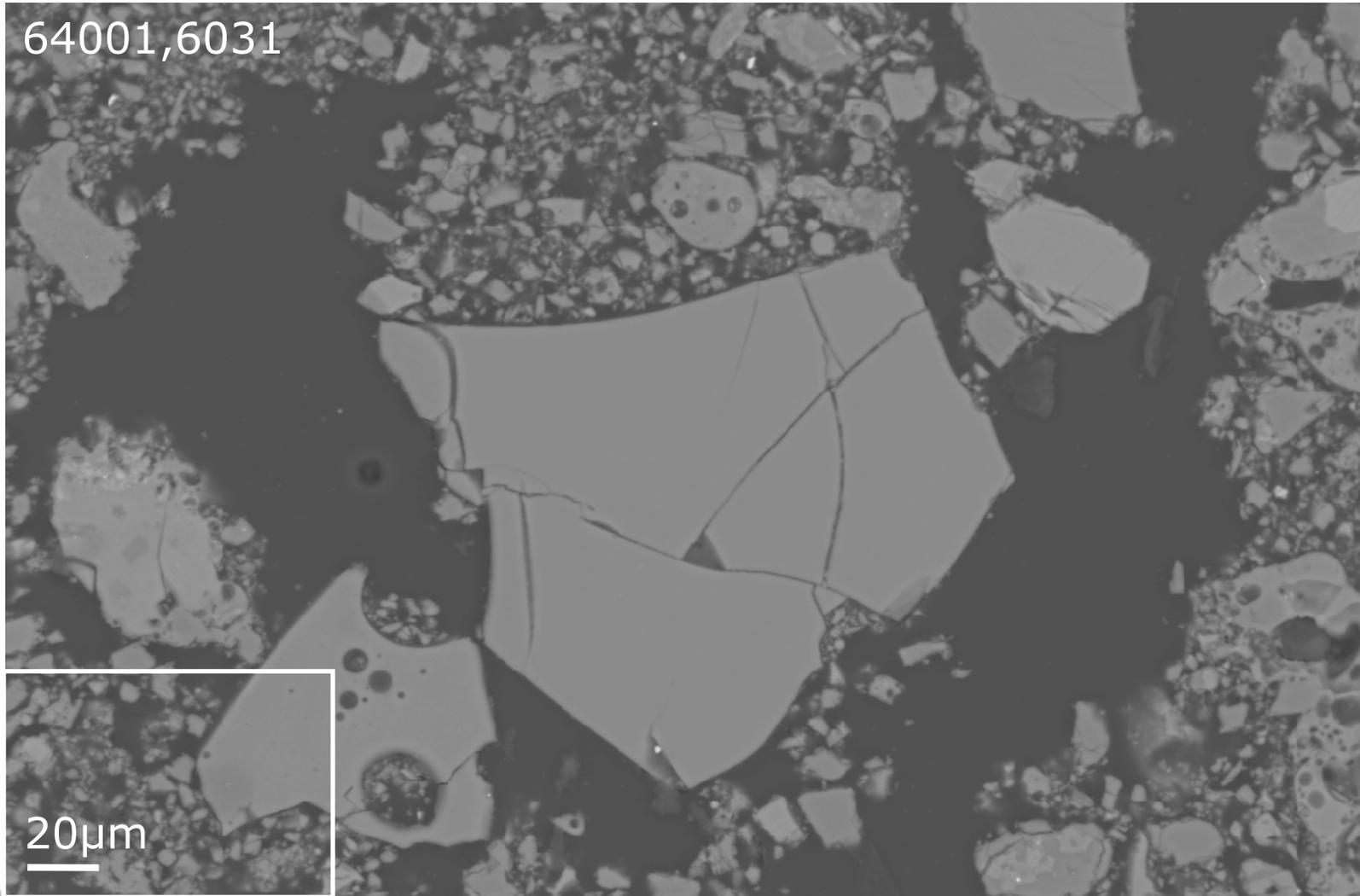
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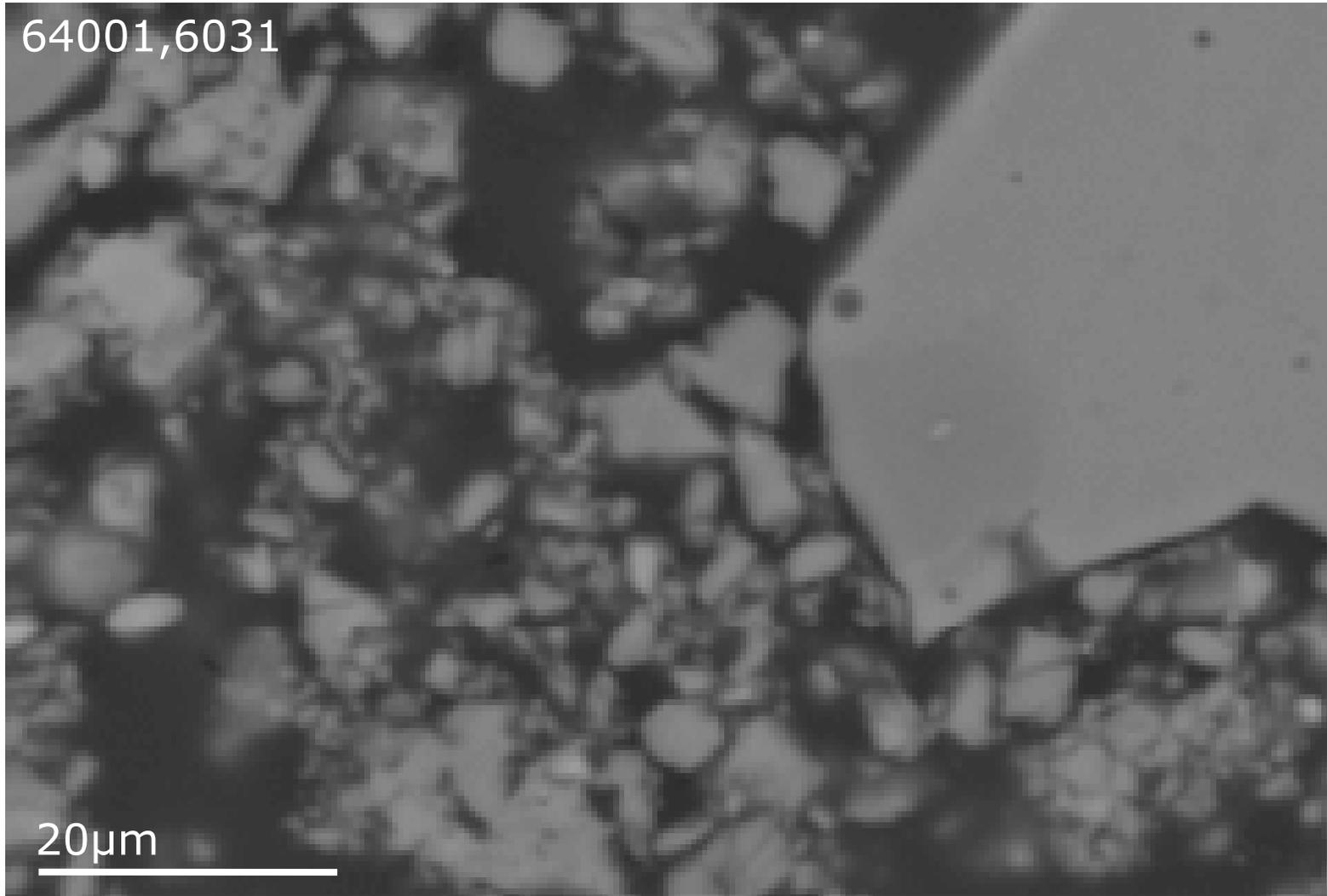
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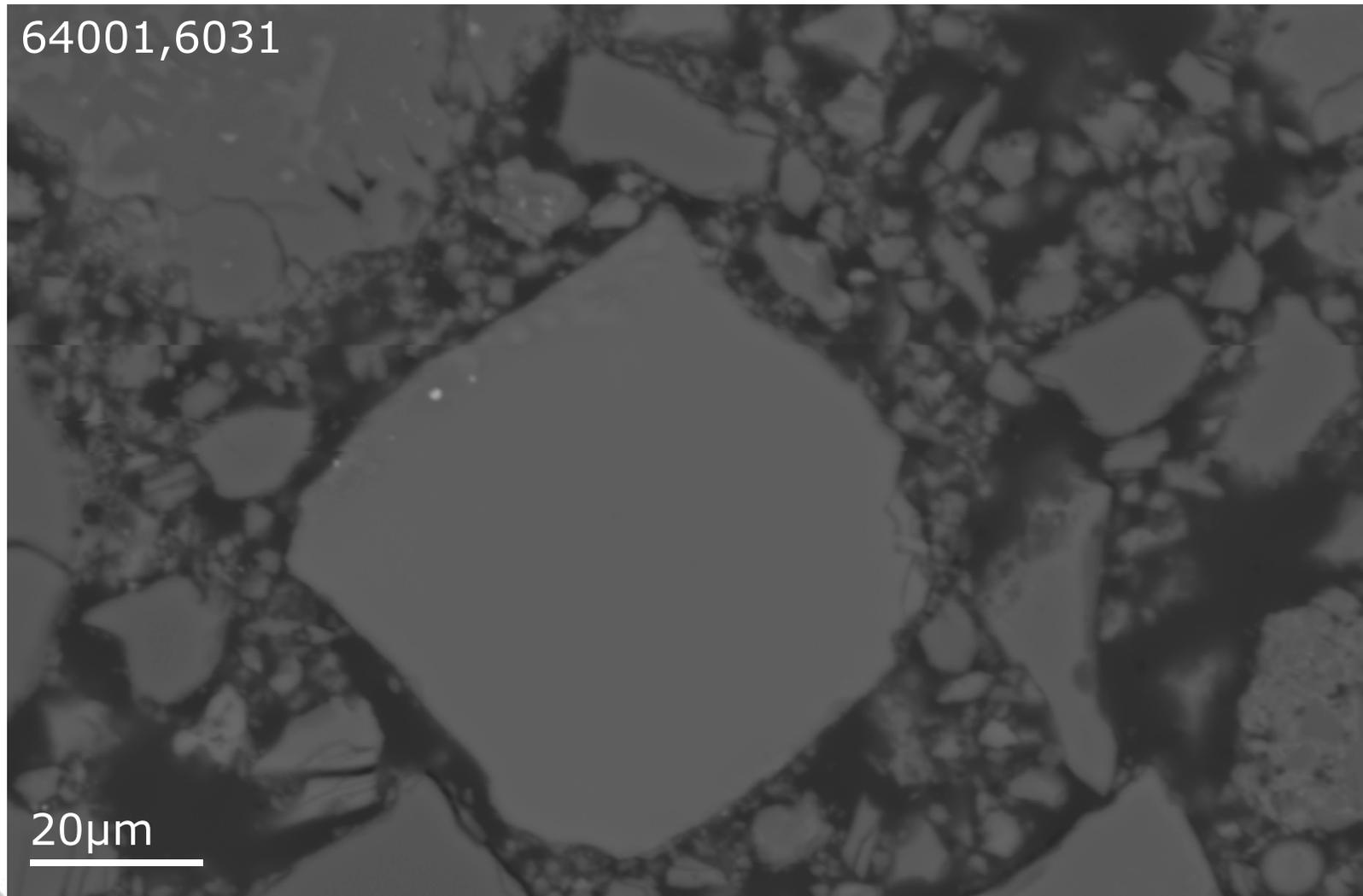
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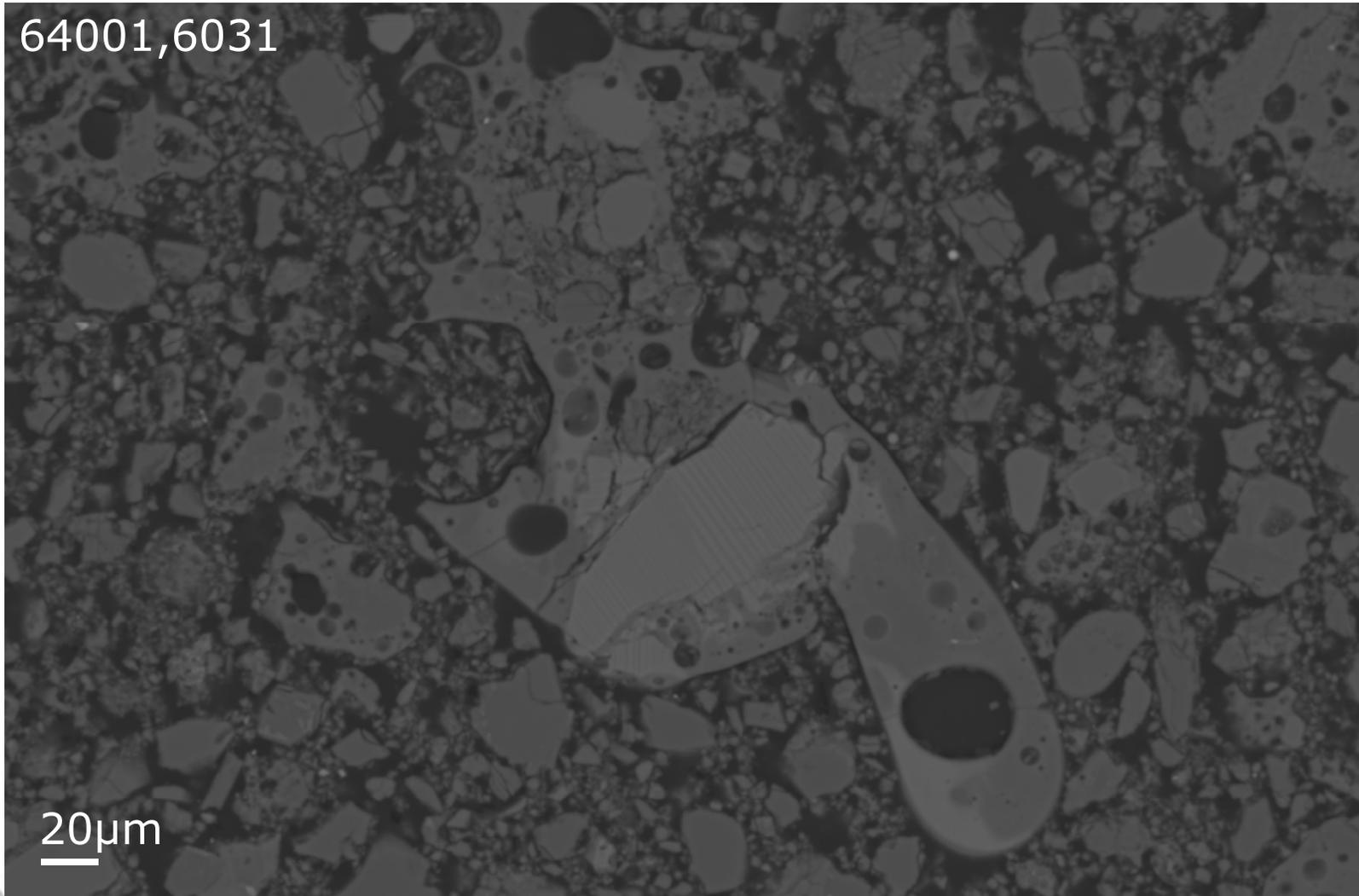
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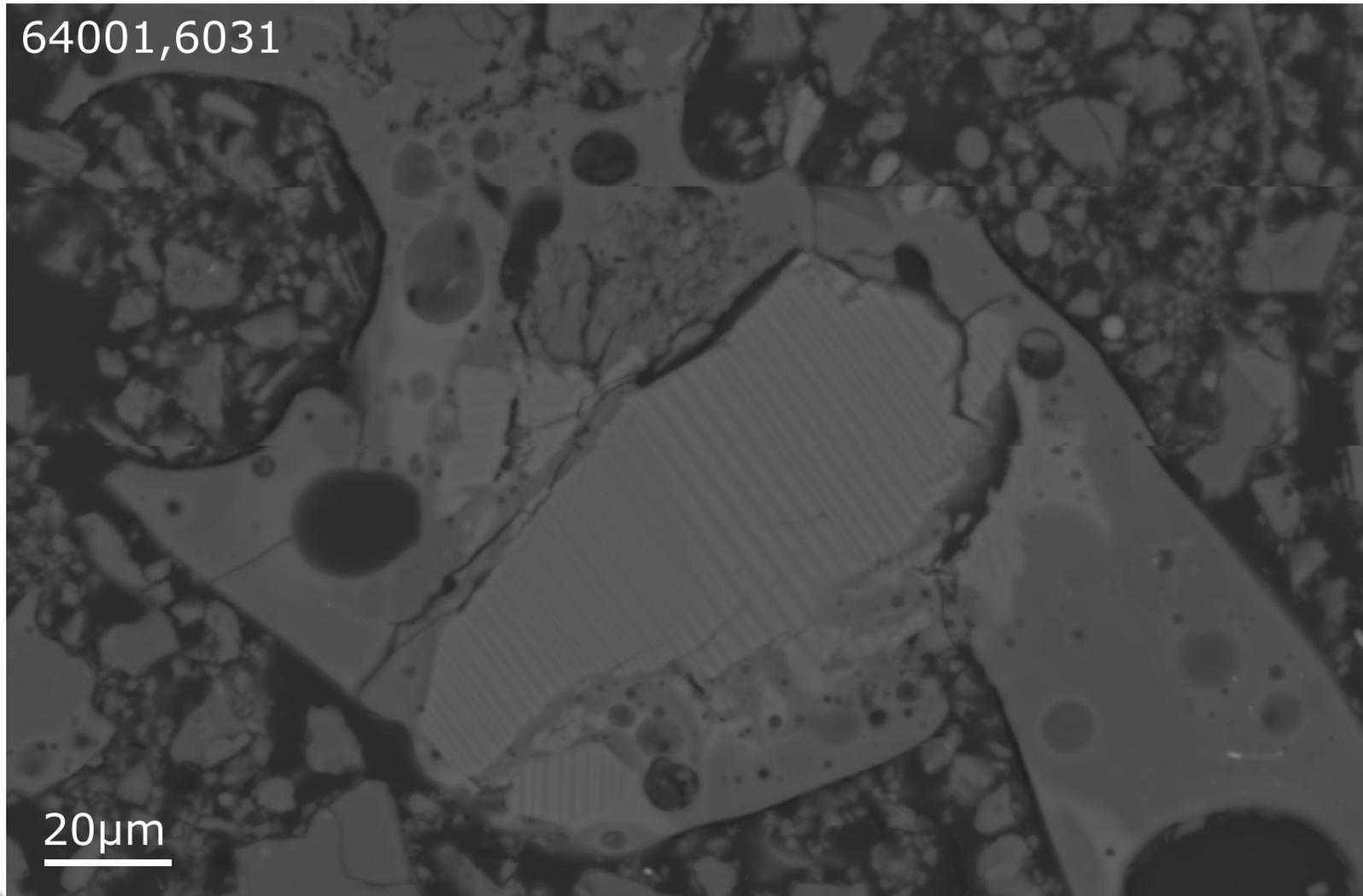
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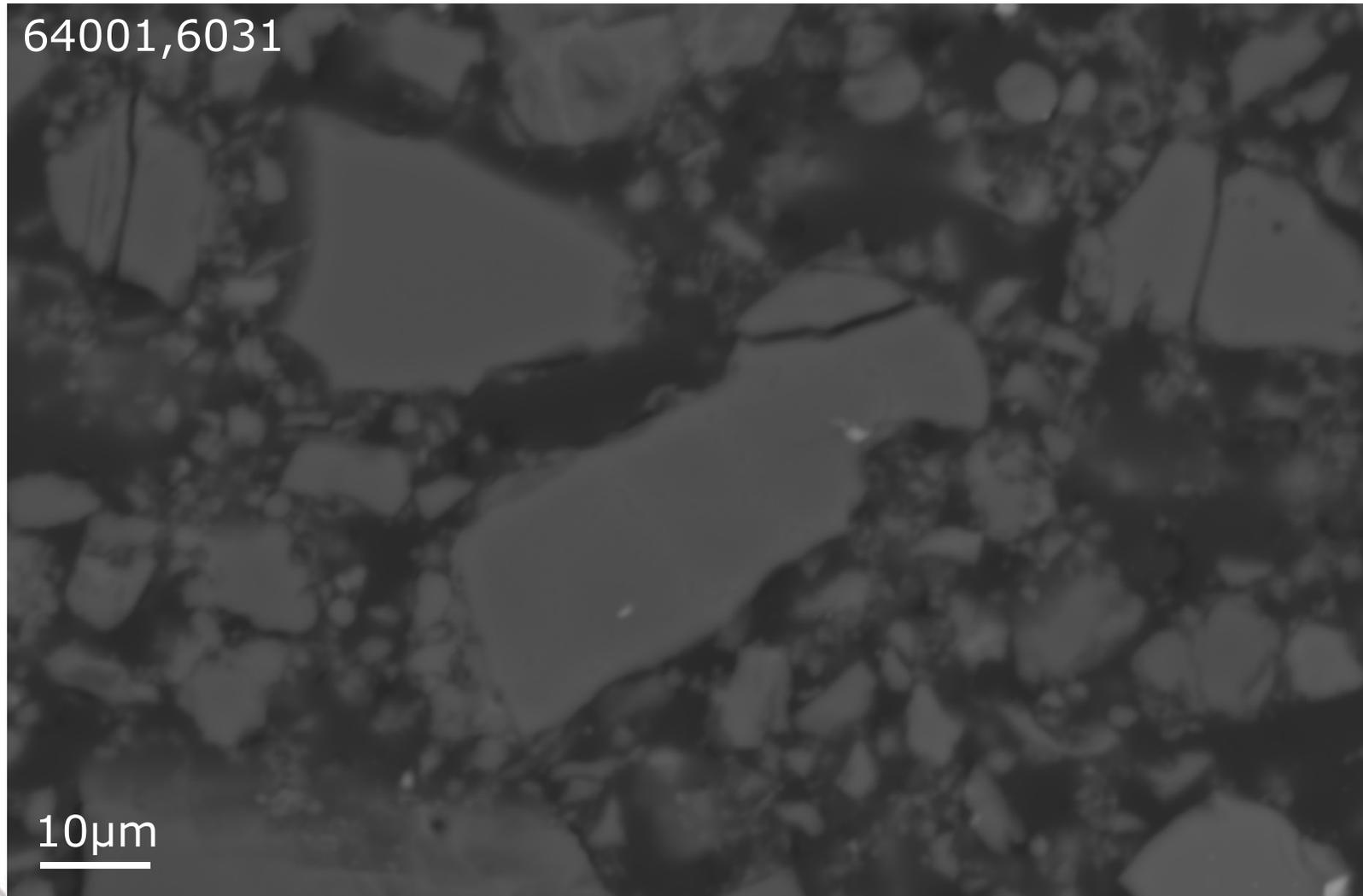
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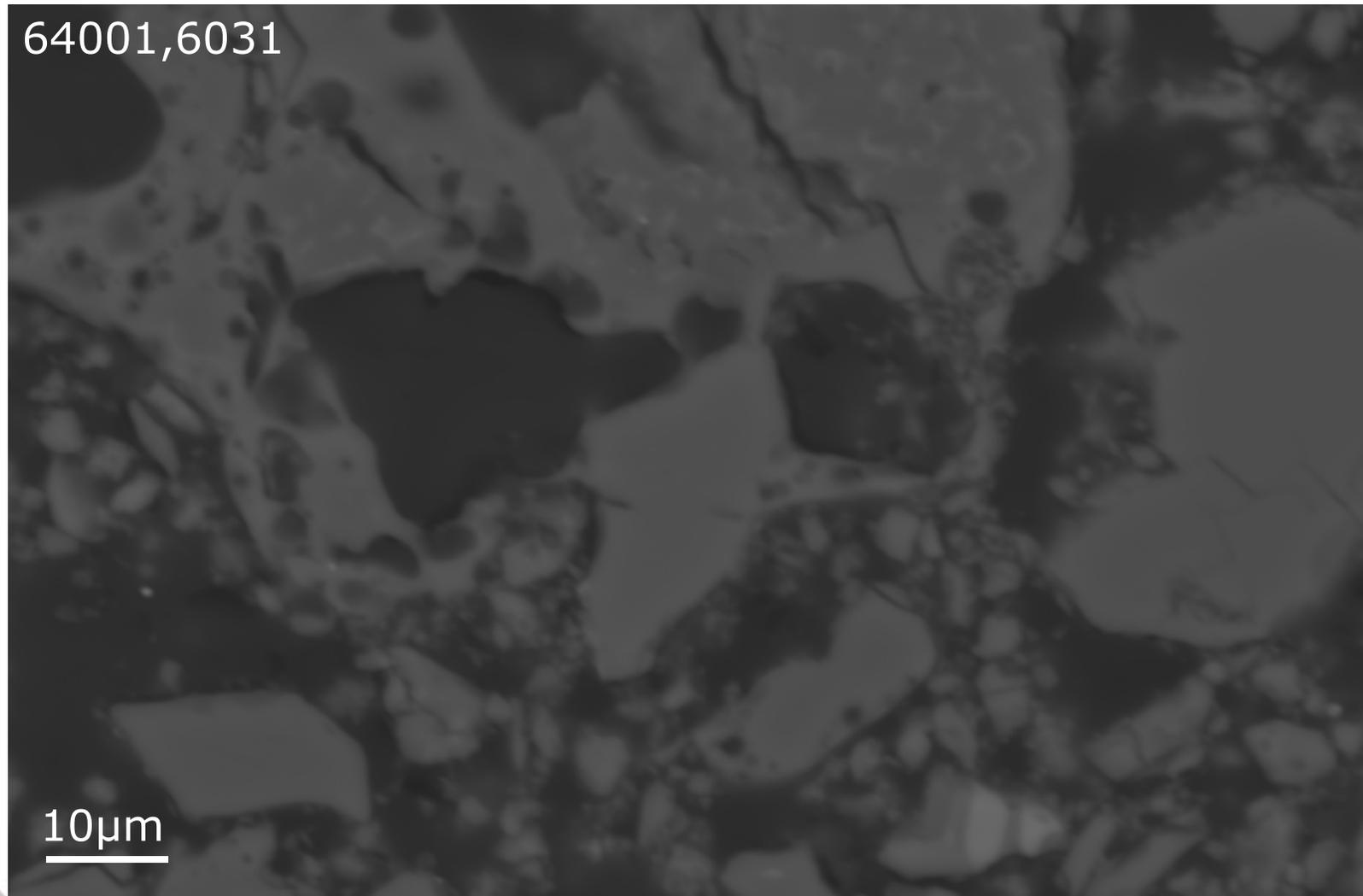
QEMSCAN[®] Backscattered Electron Photomicrograph



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