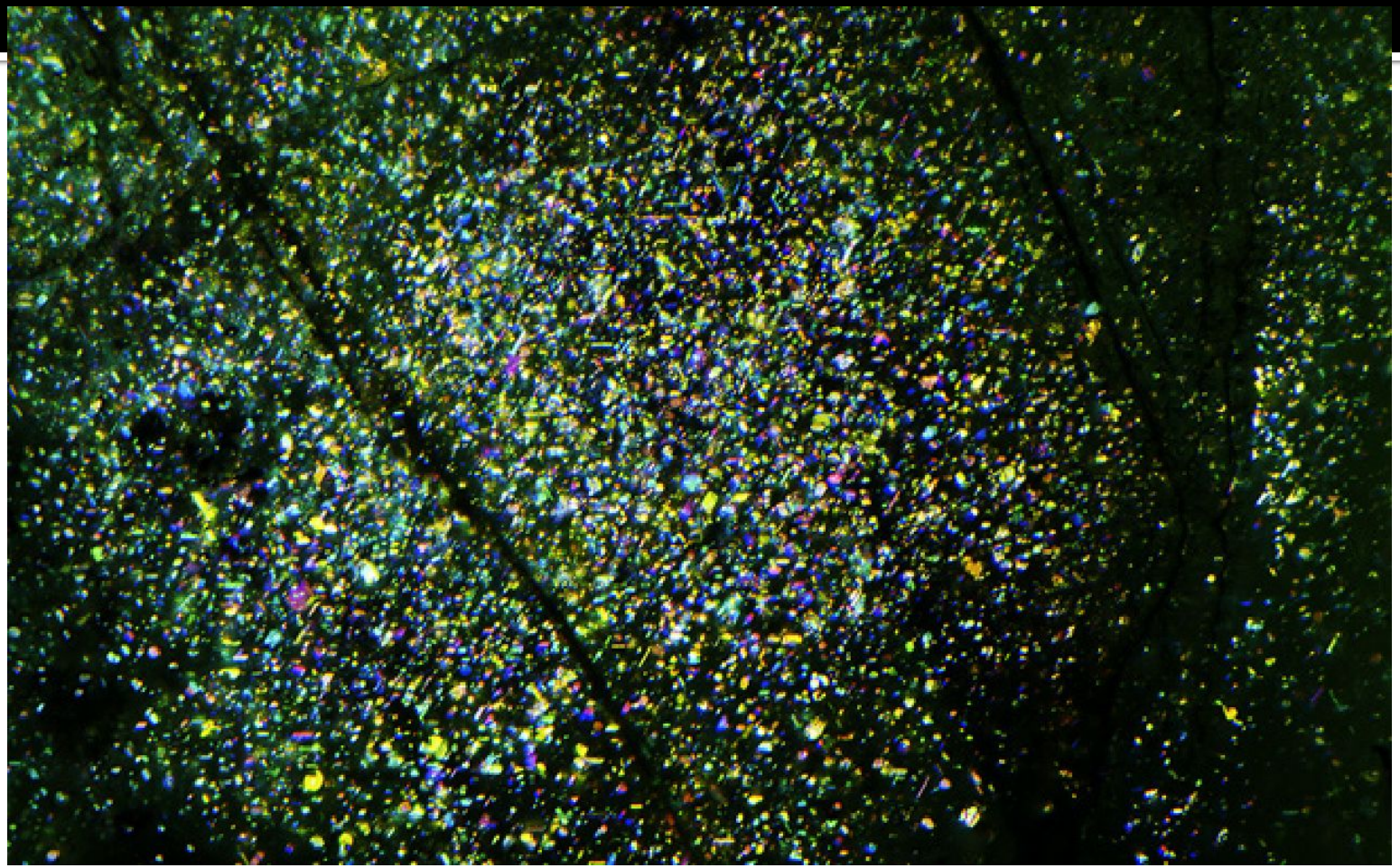
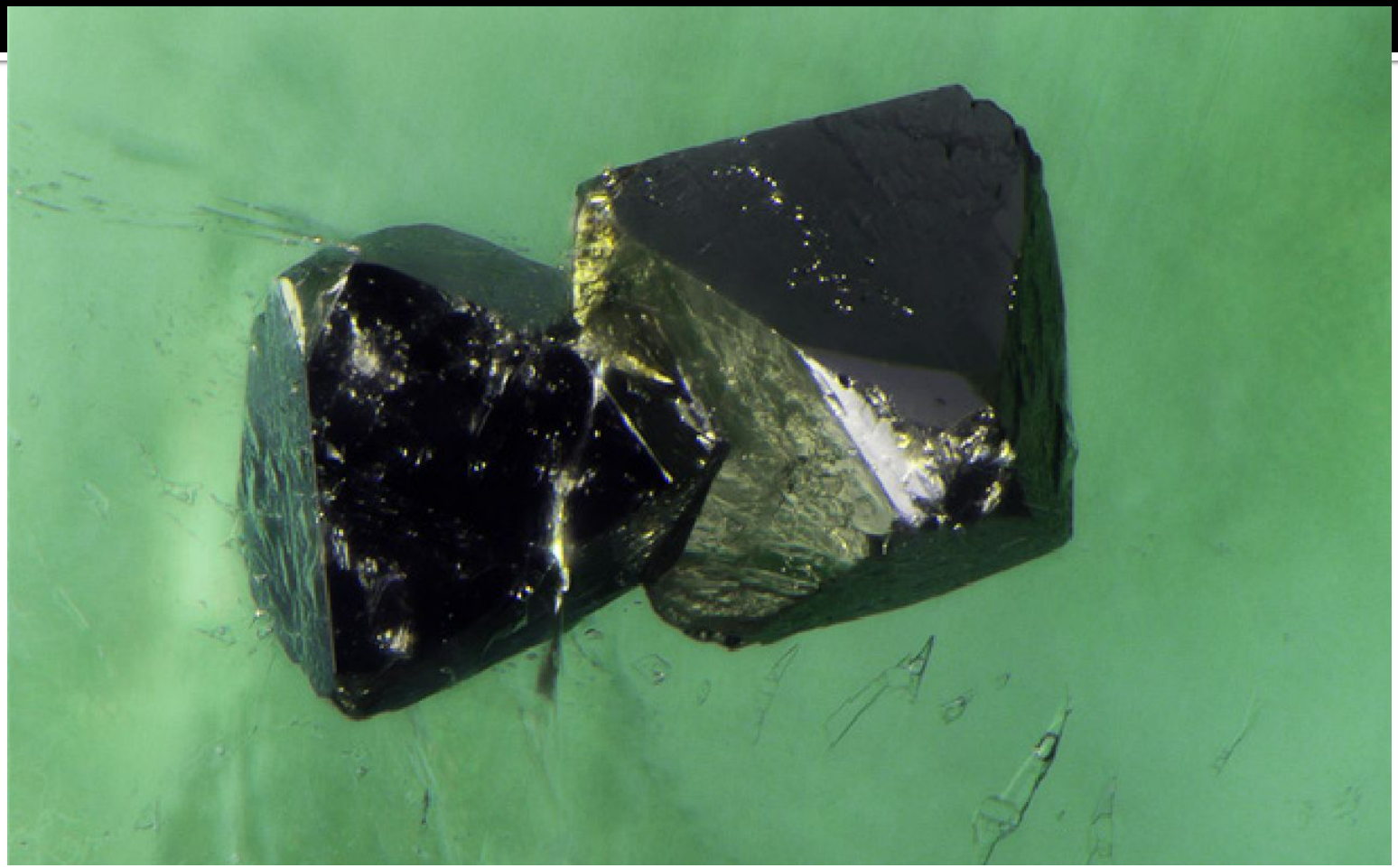
Включения в изумрудах

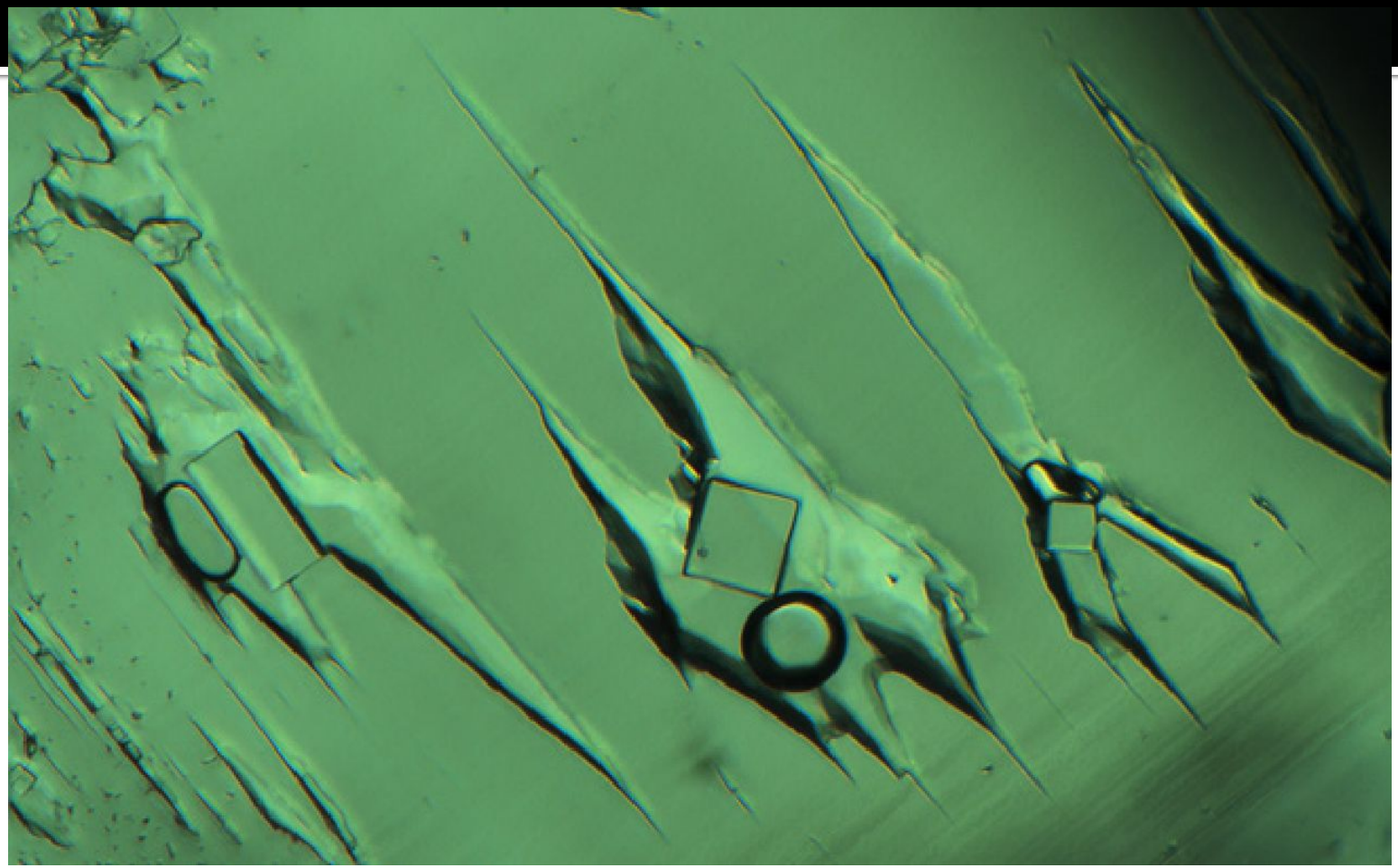
Natural



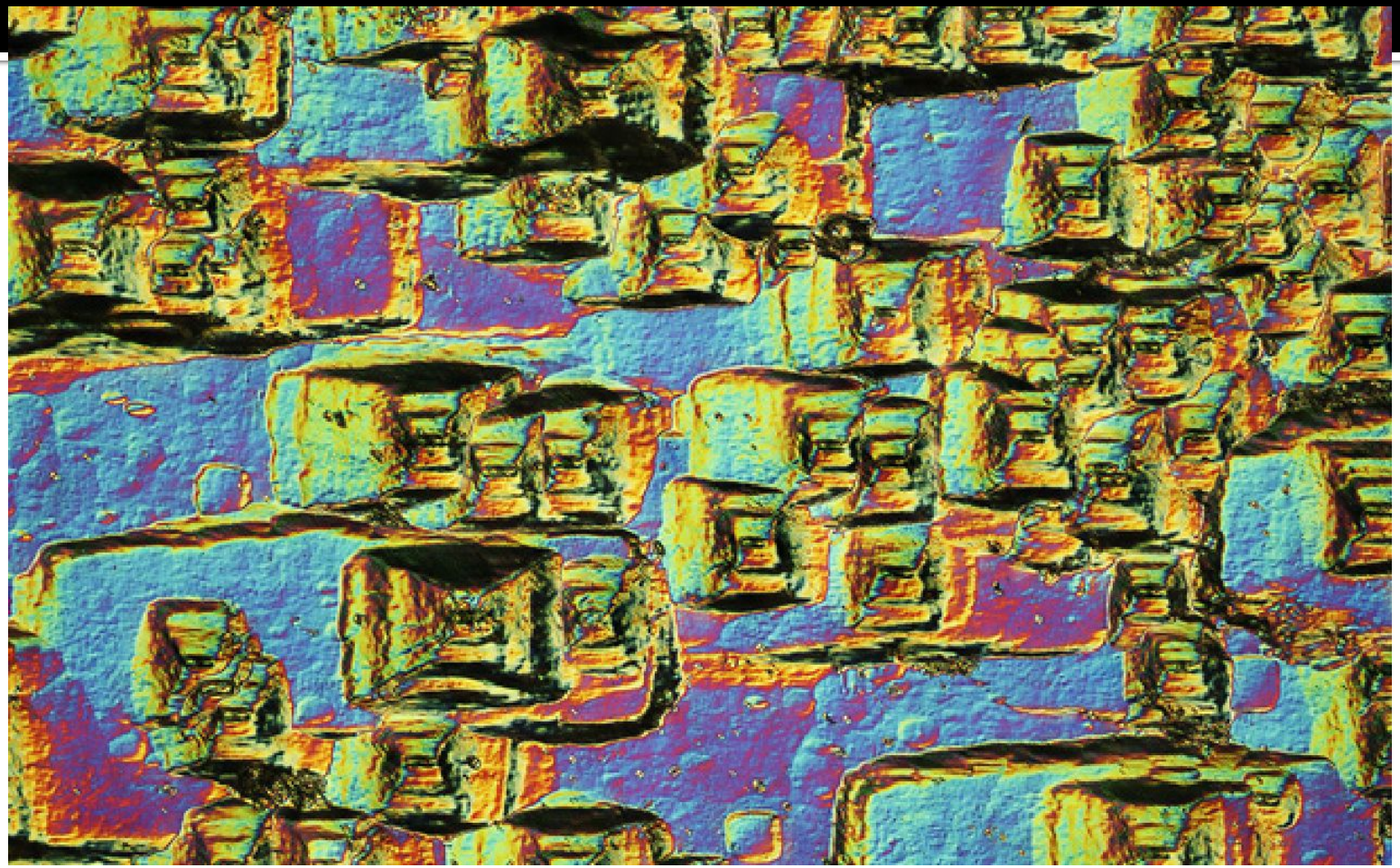
Minute fluid inclusions parallel to the basal plane are the cause of asterism in this emerald from Madagascar. Thin-film interference causes rainbow colors visible at high magnification. Field of view 1.8 mm.



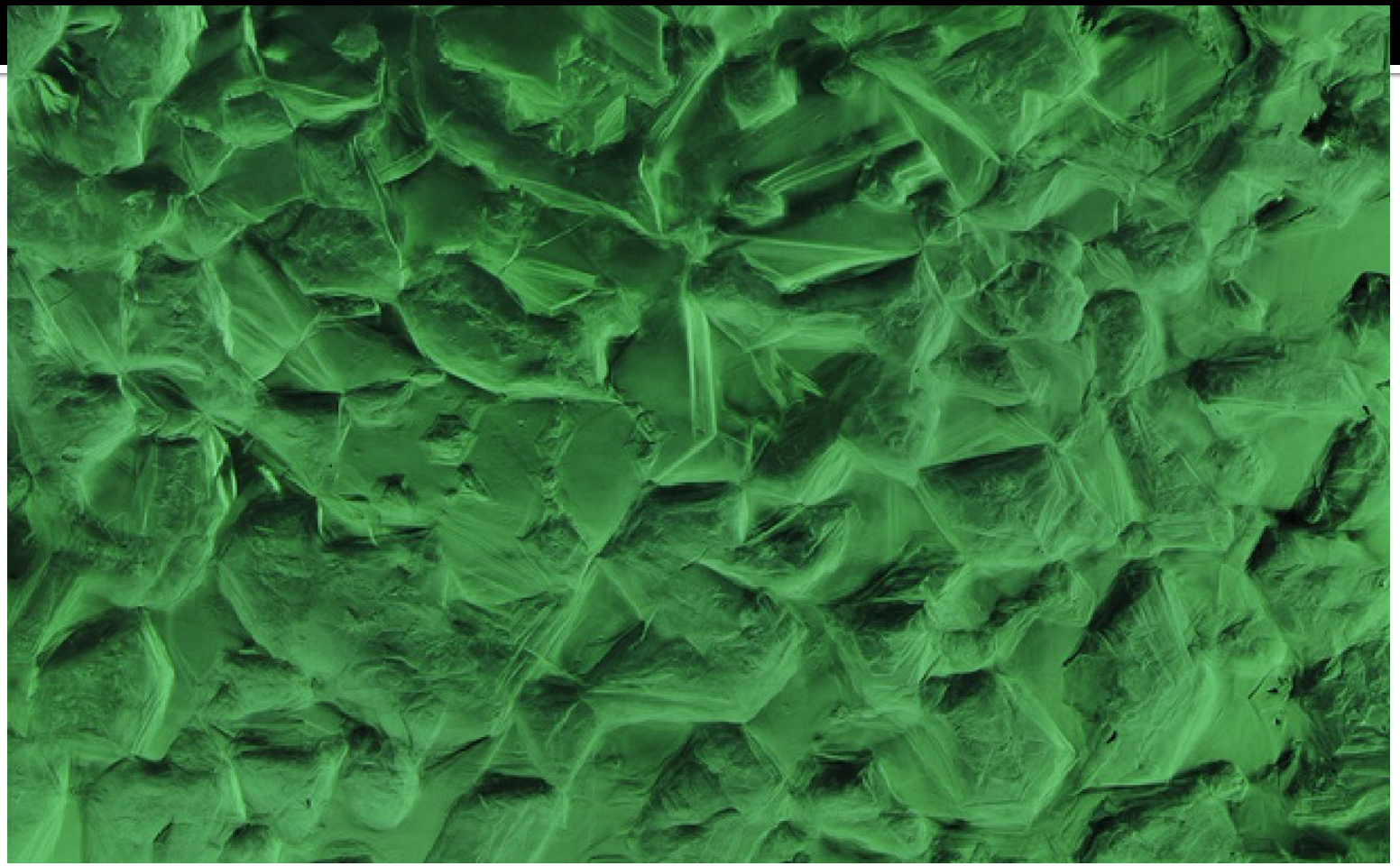
Well-formed octahedral crystals of pyrite are a welcome sight in this Colombian emerald. Field of view 2.15 mm.



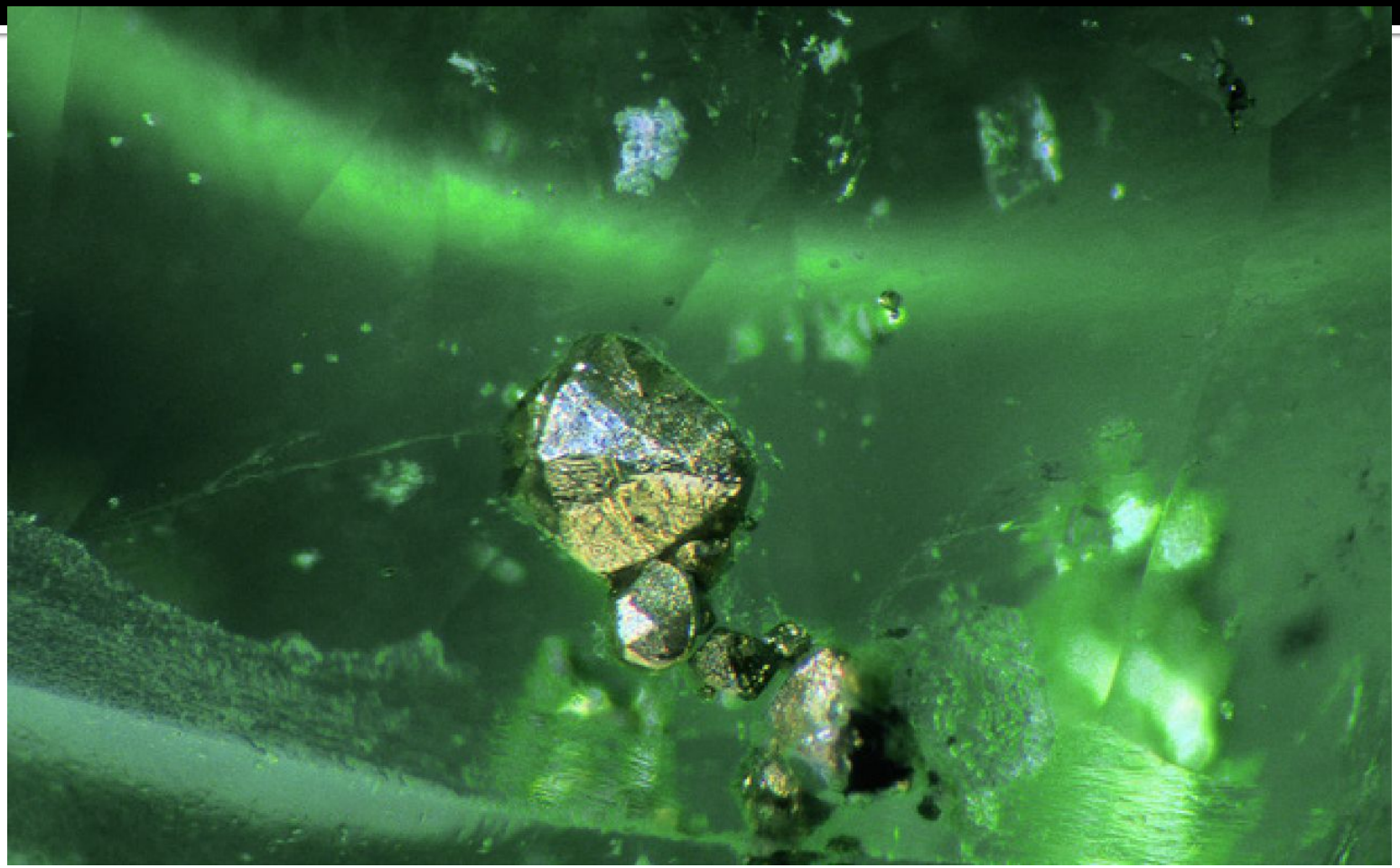
Jagged three-phase inclusions consisting of salt solution, a gas bubble,
and a salt crystal are commonly seen in Colombian emeralds. Field of view 0.91 mm.



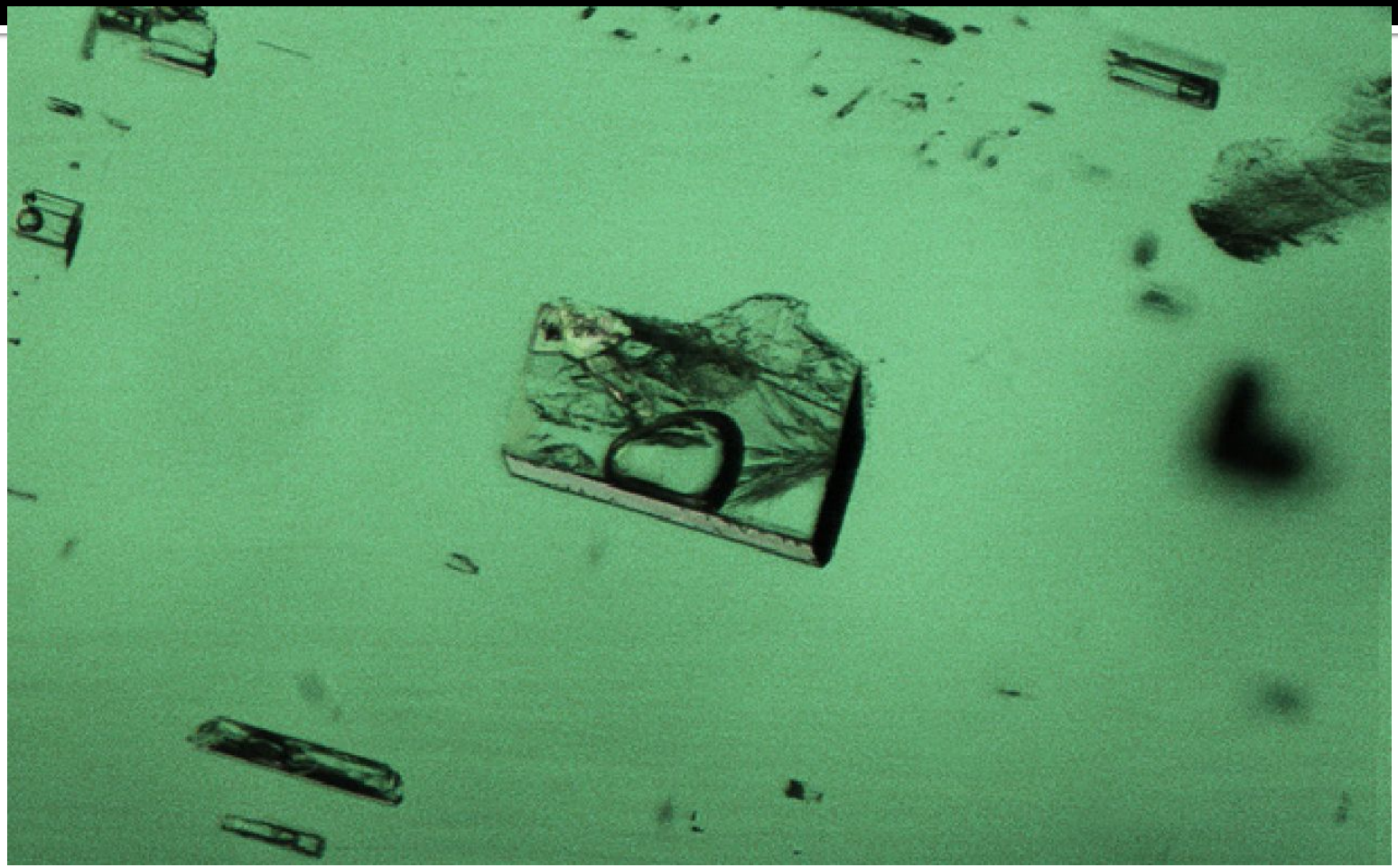
The etched prism face of an emerald from Alexander County, North Carolina, is shown in false, high-contrast color using differential interference
contrast microscopy. Field of view 0.61 mm



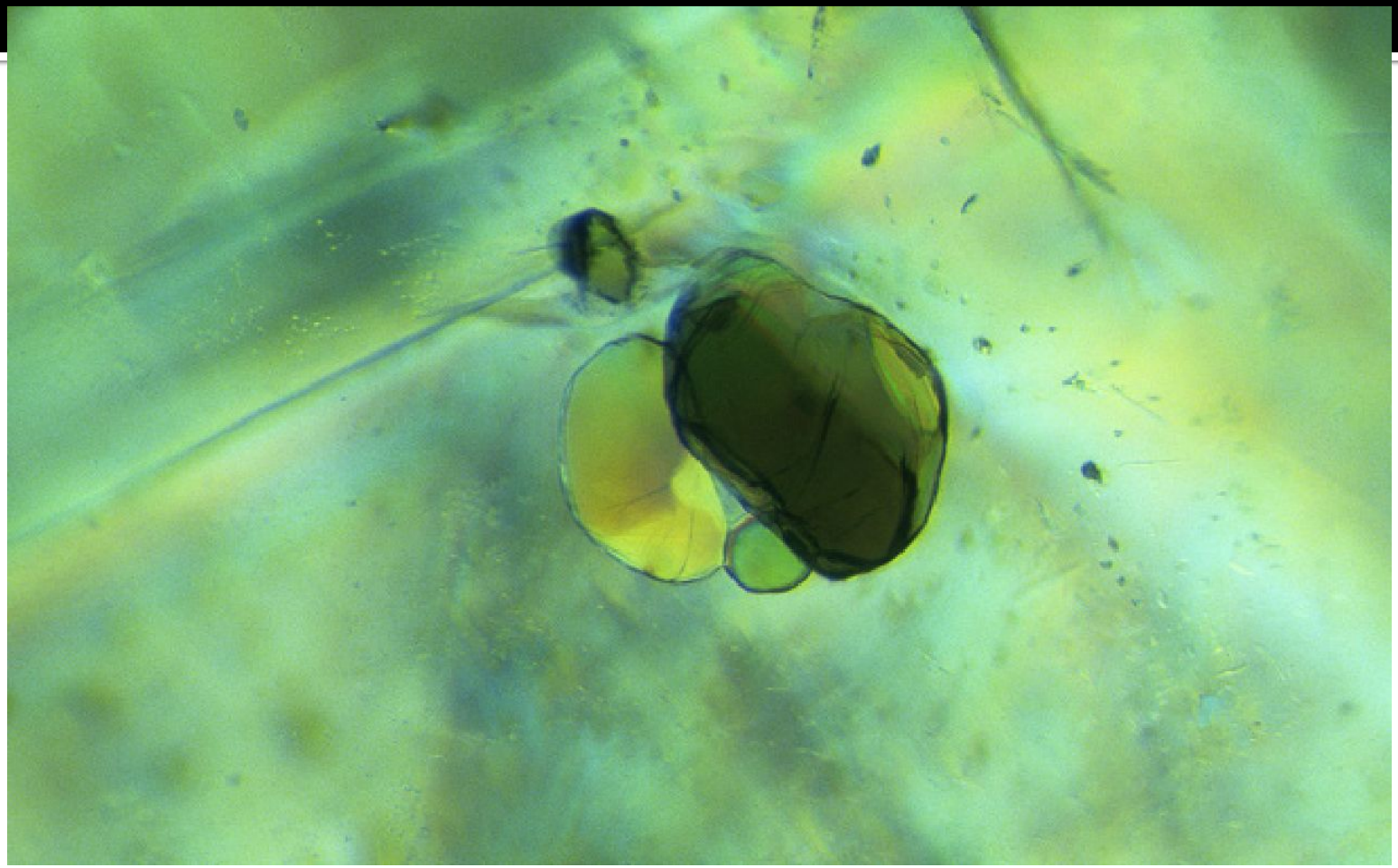
Gota de aceite results from rapid columnar growth, causing a roiled appearance in some Colombian emeralds. Field of view 2.60 mm.



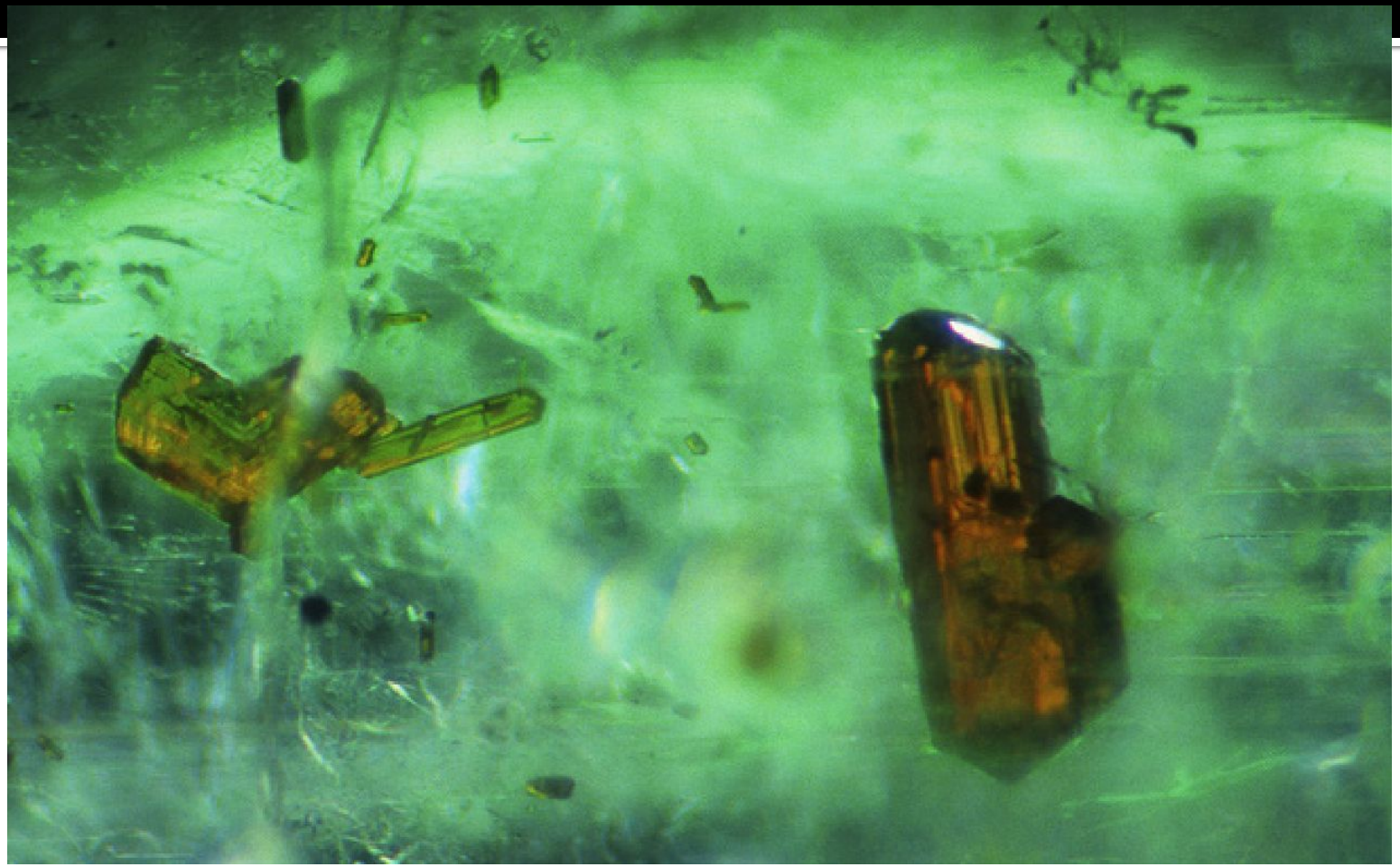
Brassy pyrite crystals are often seen in Colombian emeralds. Field of view 5.25 mm.



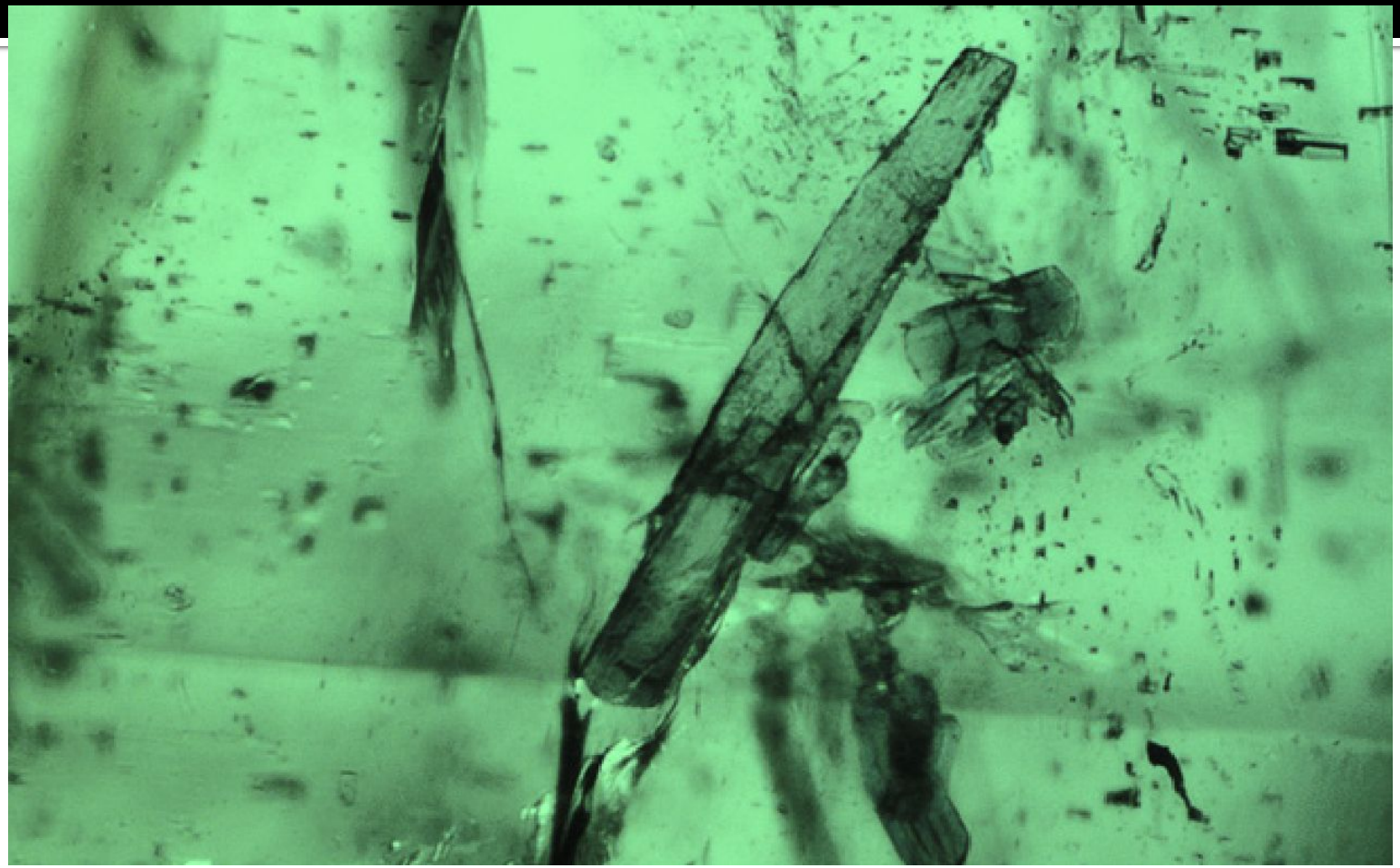
This complex blocky fluid inclusion contains a liquid, a gas, and multiple daughter crystals. Field of view 1.42 mm.



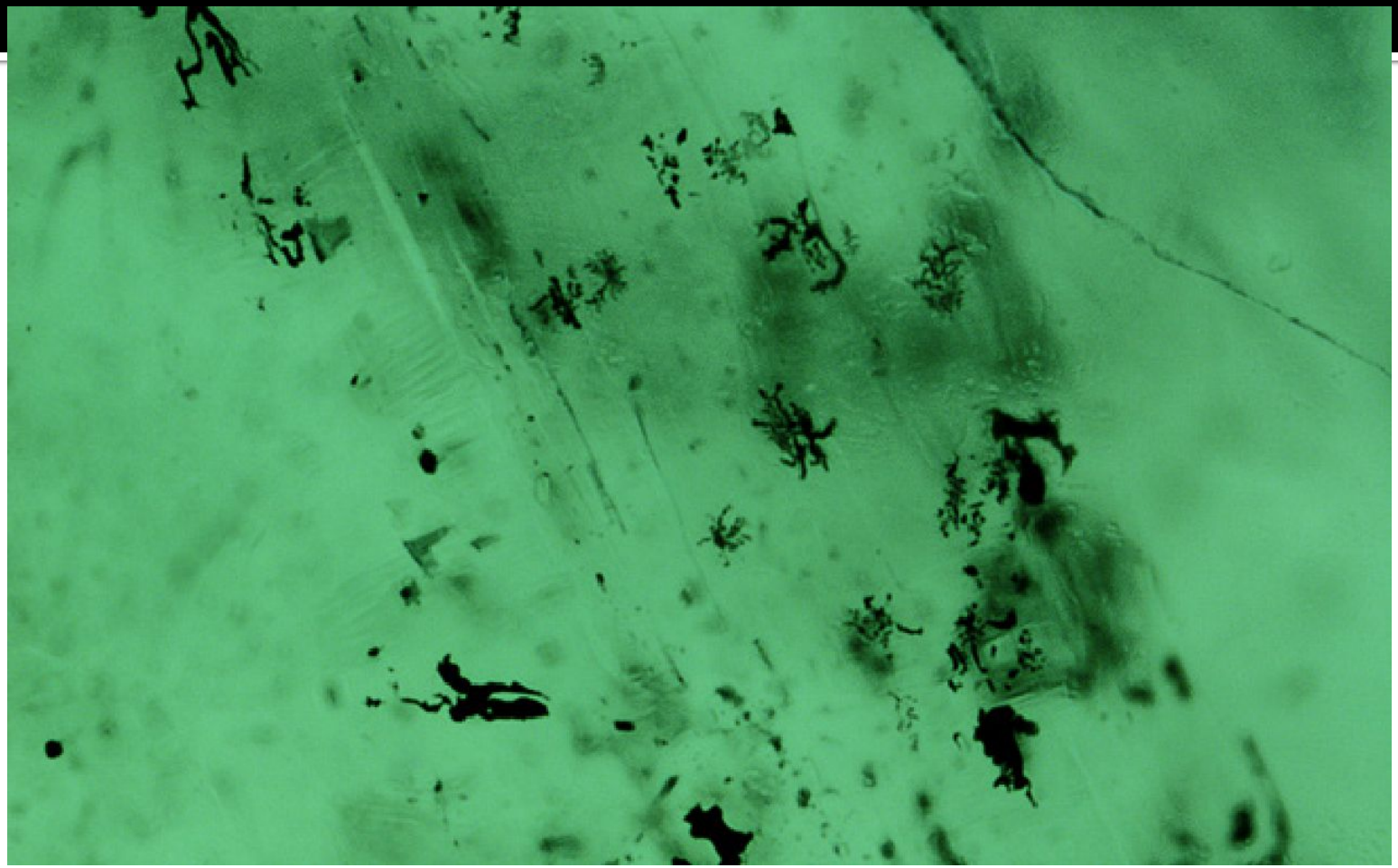
Biotite crystals, shown here in polarized light, are common in emeralds from schist-hosted deposits. Field of view 2.15 mm.



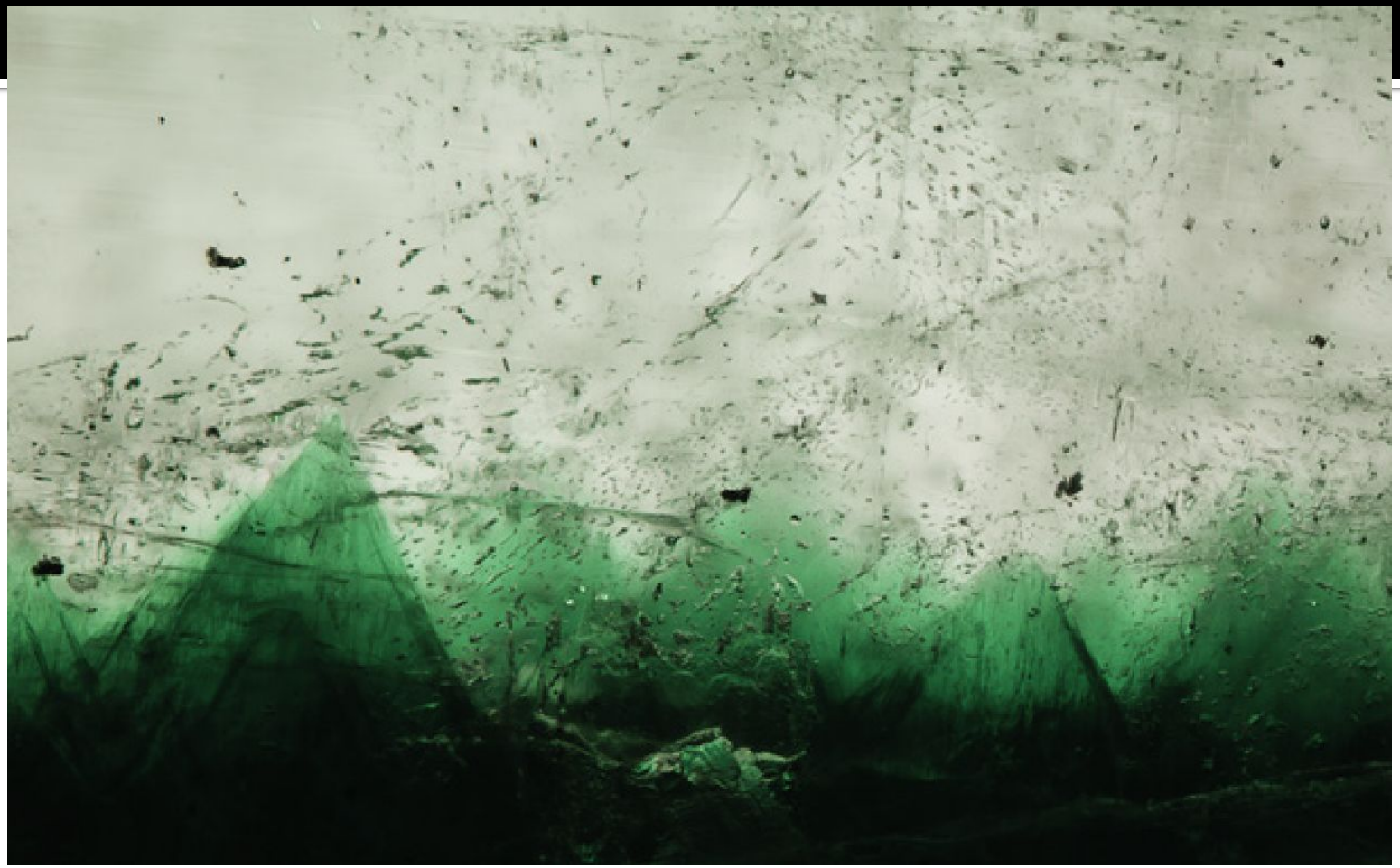
This emerald from North Carolina contains vibrant orangy brown rutile inclusions. Field of view 6.25 mm.



Amphibole crystals are occasionally seen in emeralds from Zambia.
Field of view 1.72 mm.

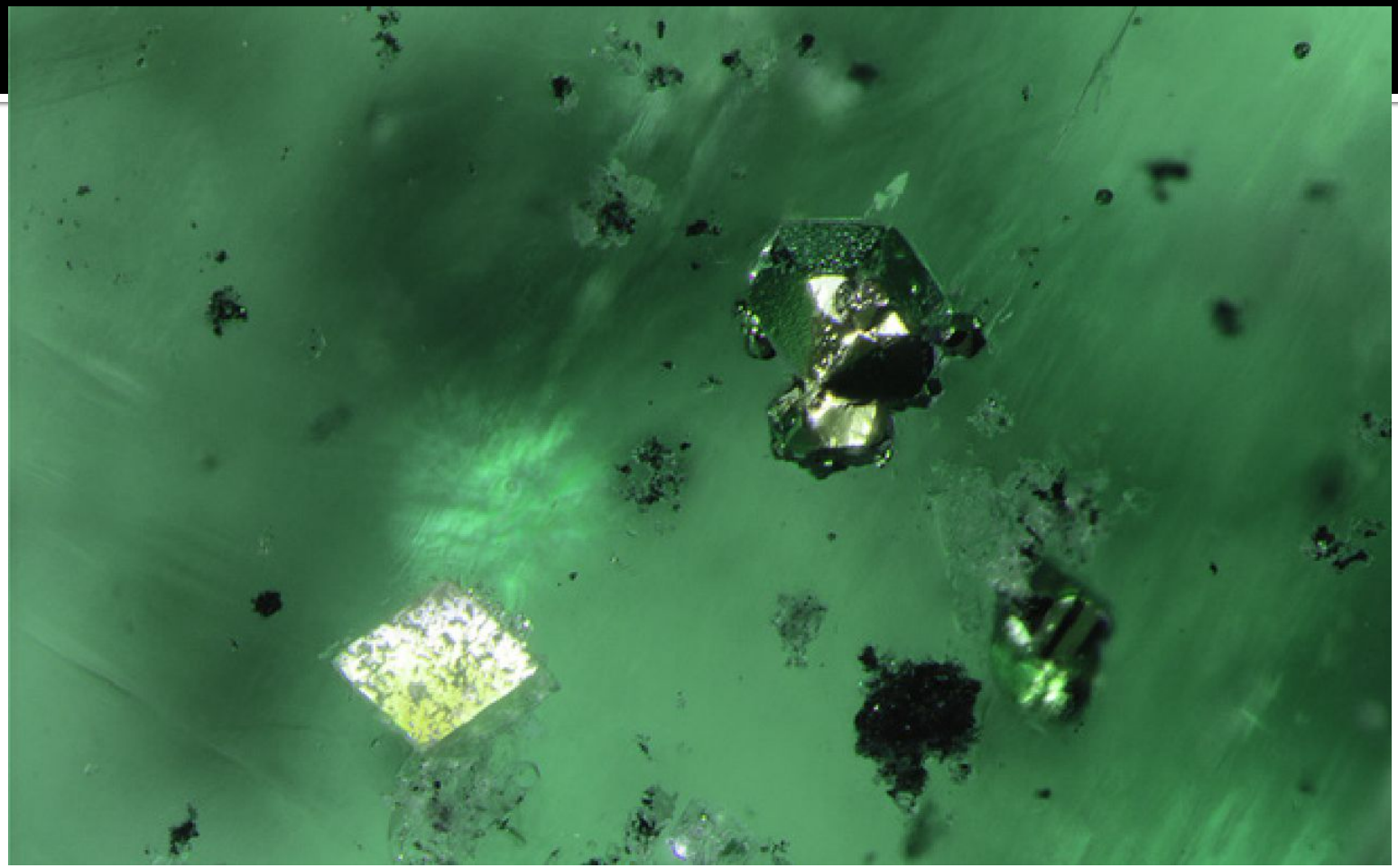


Skeletal platy crystals of ilmenite are scattered throughout this Zambian
emerald. Field of view 1.91 mm.

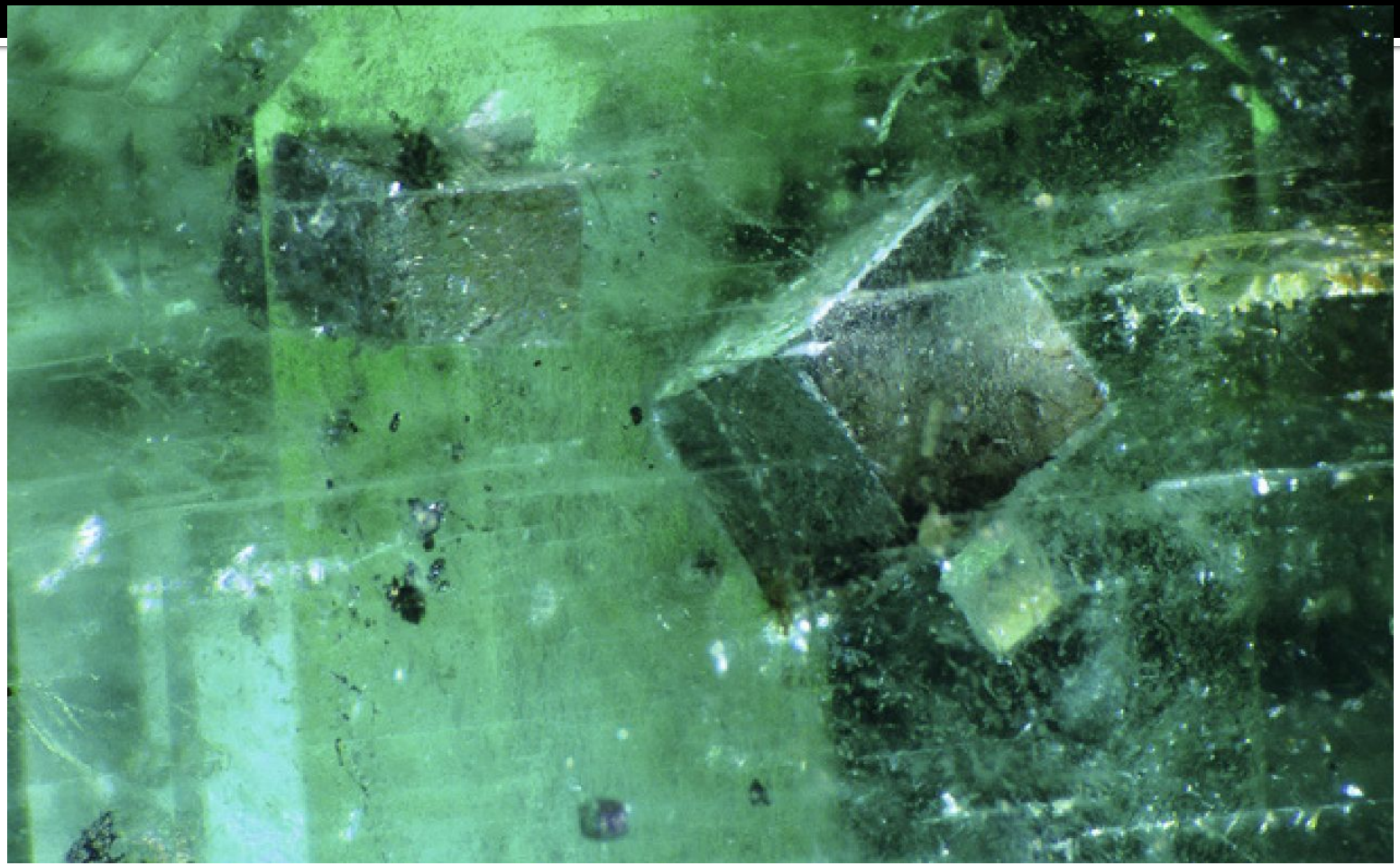


This Colombian emerald shows prominent angular color zoning reminiscent
of a mountain range. Field of view 14.52 mm.

Blocky three-phase inclusions are crystallographically aligned in this
Brazilian emerald. Field of view 1.42 mm

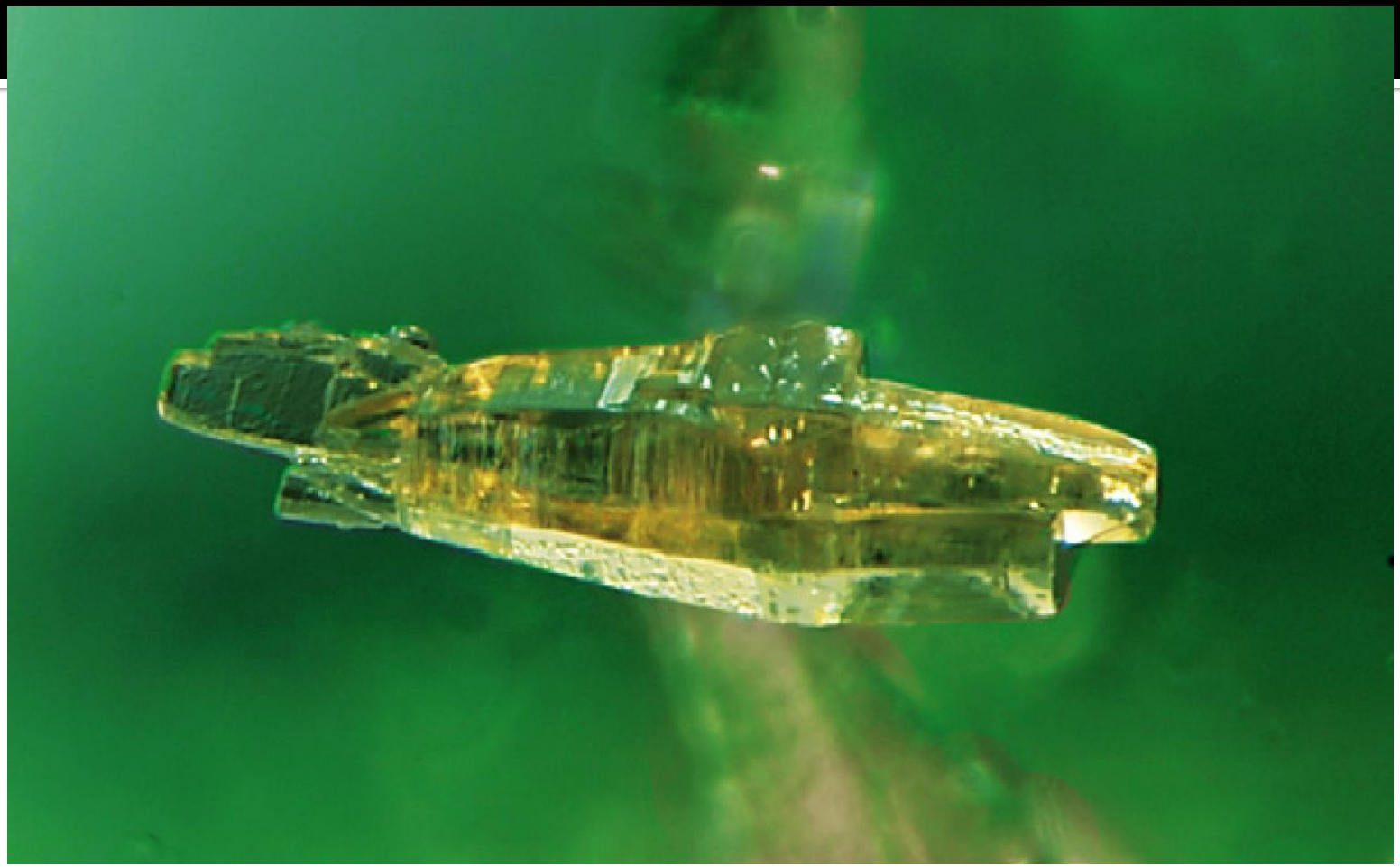


An inclusion suite often seen in Colombian emeralds consists of carbonates, pyrite, and fragments of black shale. Field of view 2.53 mm.

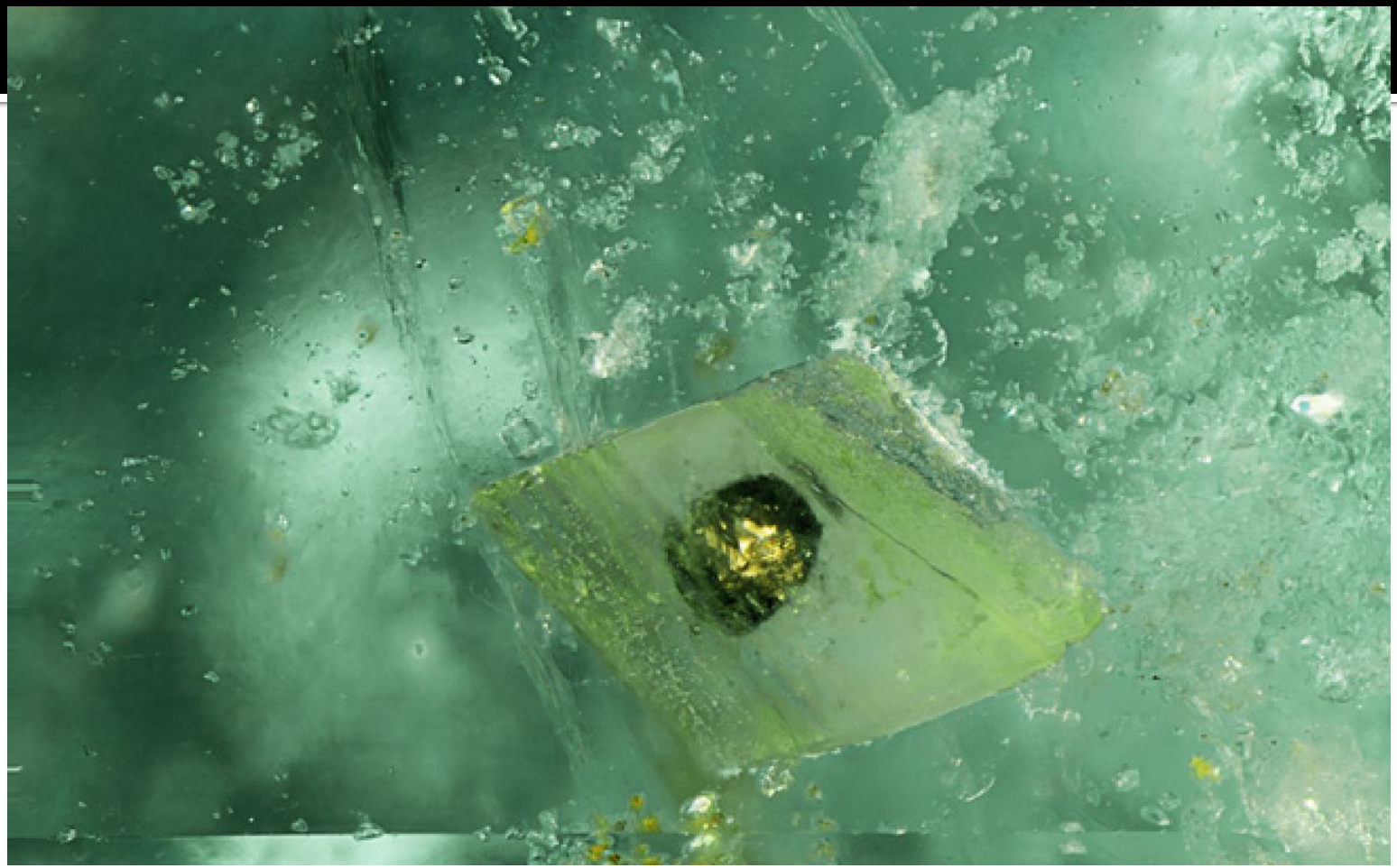


Several rhombohedral magnesite crystals are present in this emerald
from Santa Terezinha de Goiás, Brazil. Field of view 8.68 mm.

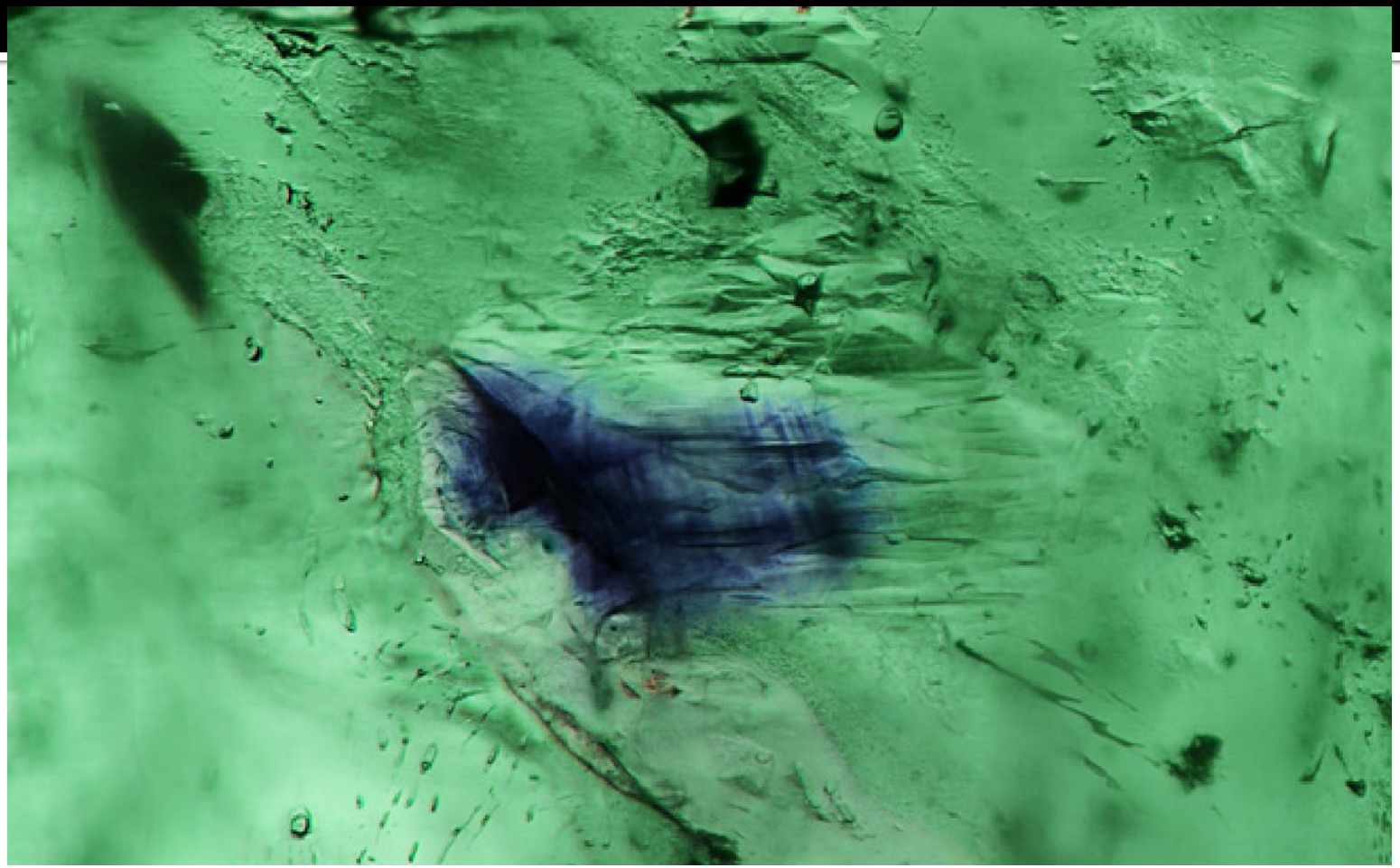
Tremolite inclusions are densely packed in this emerald from Zimbabwe.
Field of view 0.86 mm



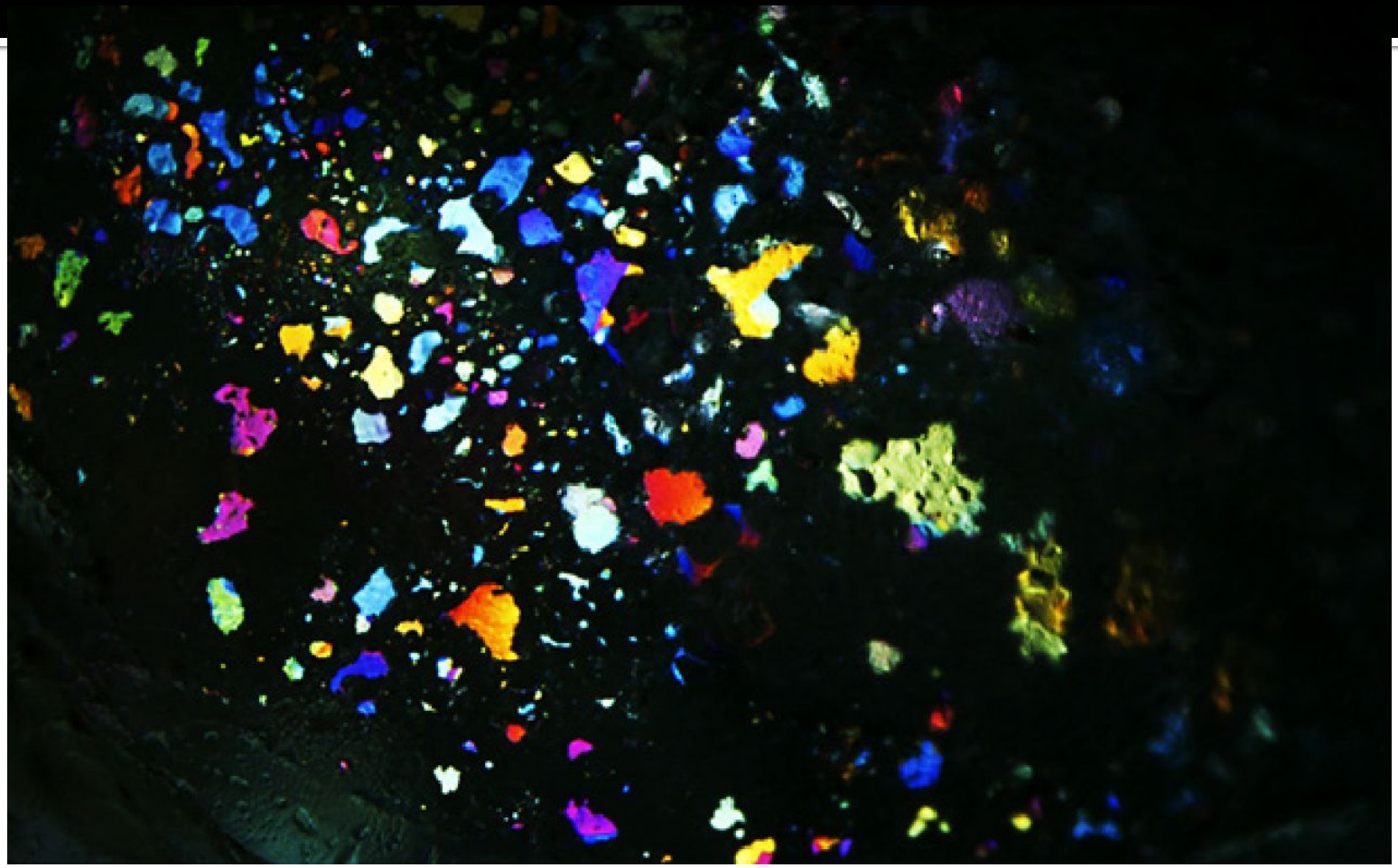
A very rare inclusion of parisite is diagnostic of Colombian origin.
Field of view 0.82 mm.



This Colombian emerald contains a carbonate crystal that is included
with a pyrite crystal. Field of view 2.34 mm.

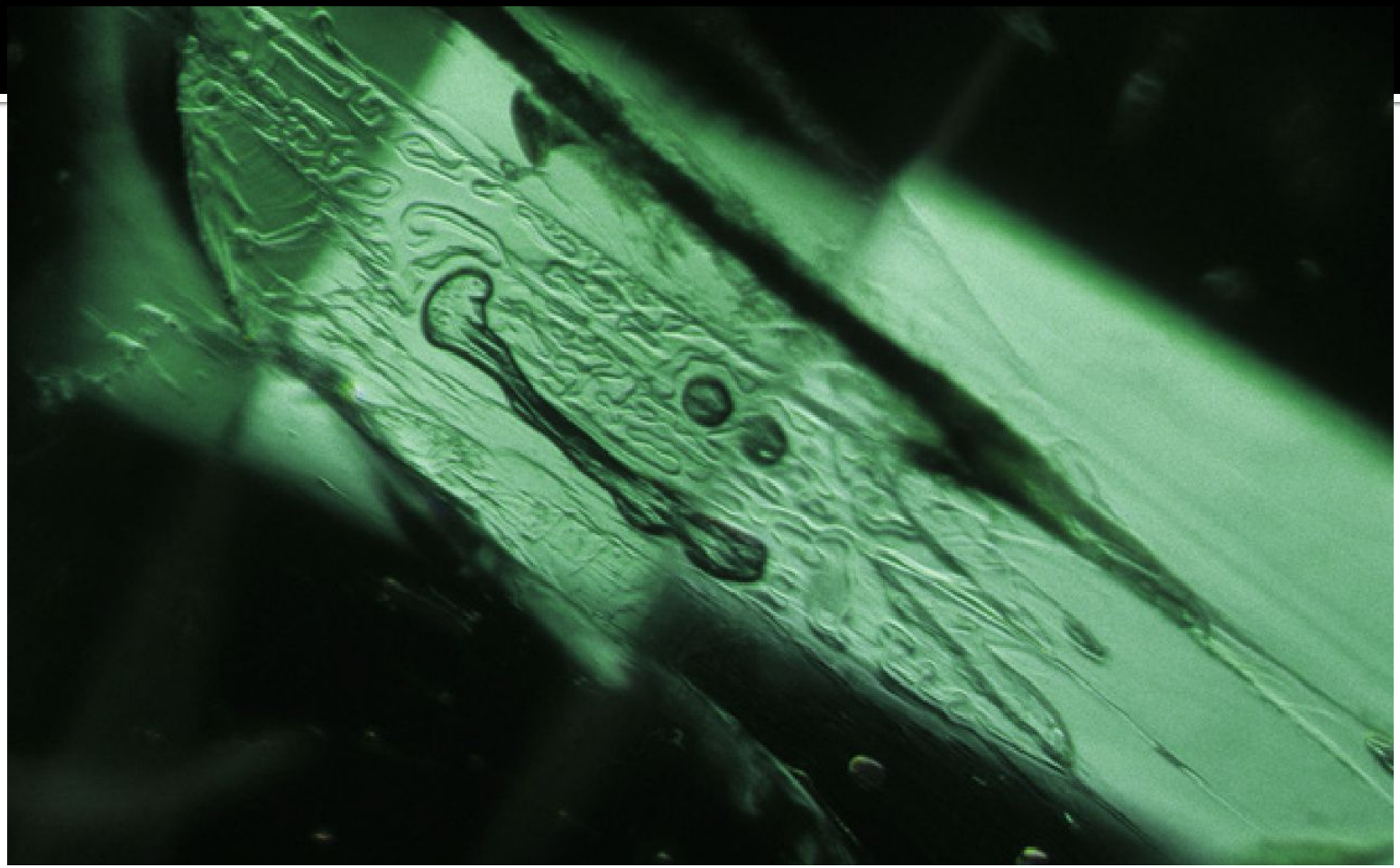


A rare inclusion of purple fluorite is seen in high contrast to its green emerald host. Field of view 2.34 mm.

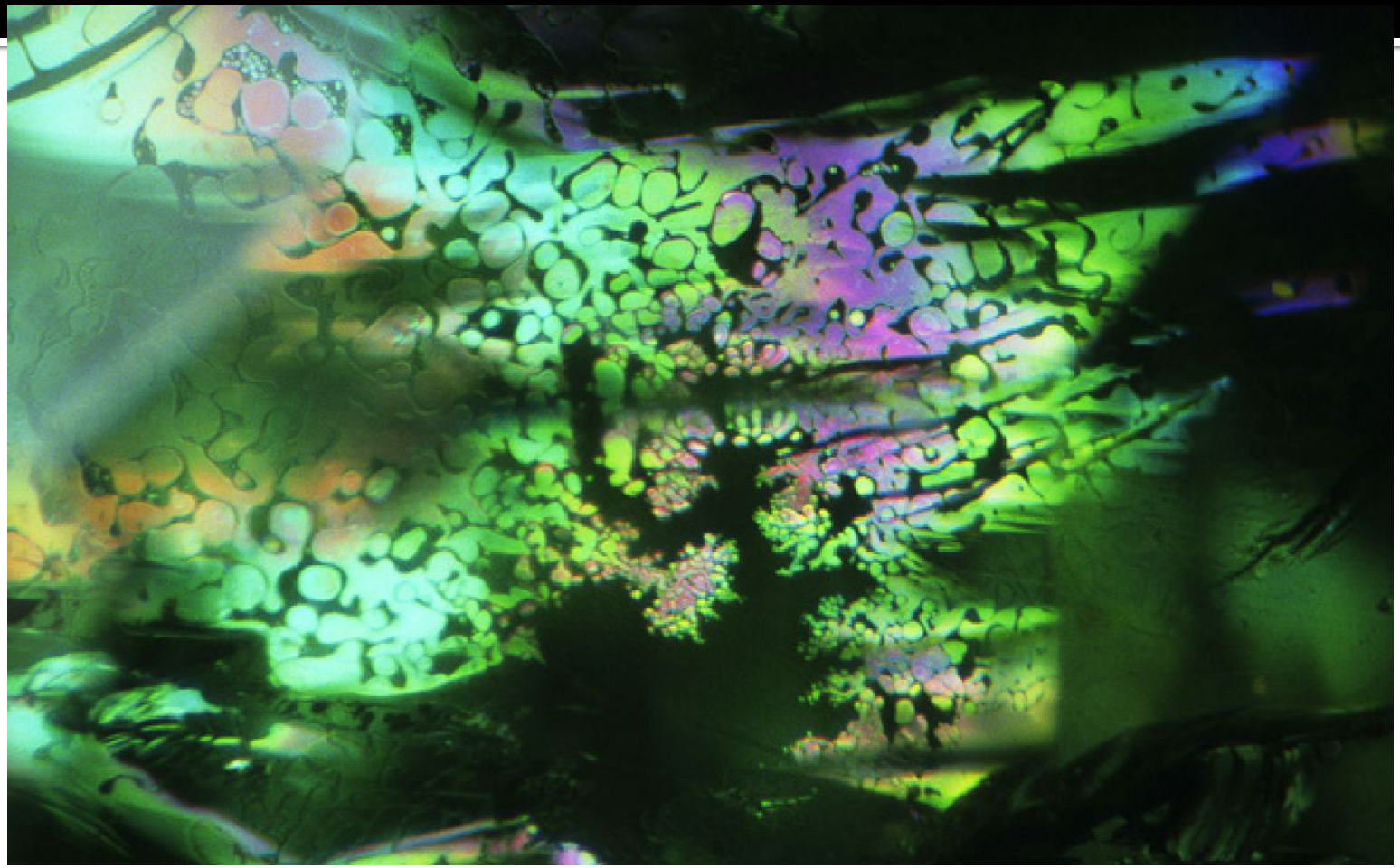


Russian emeralds often host brightly colored reflective thin-film fluid inclusions. These are oriented perpendicular to the optic axis. Field of view 2.15 mm.

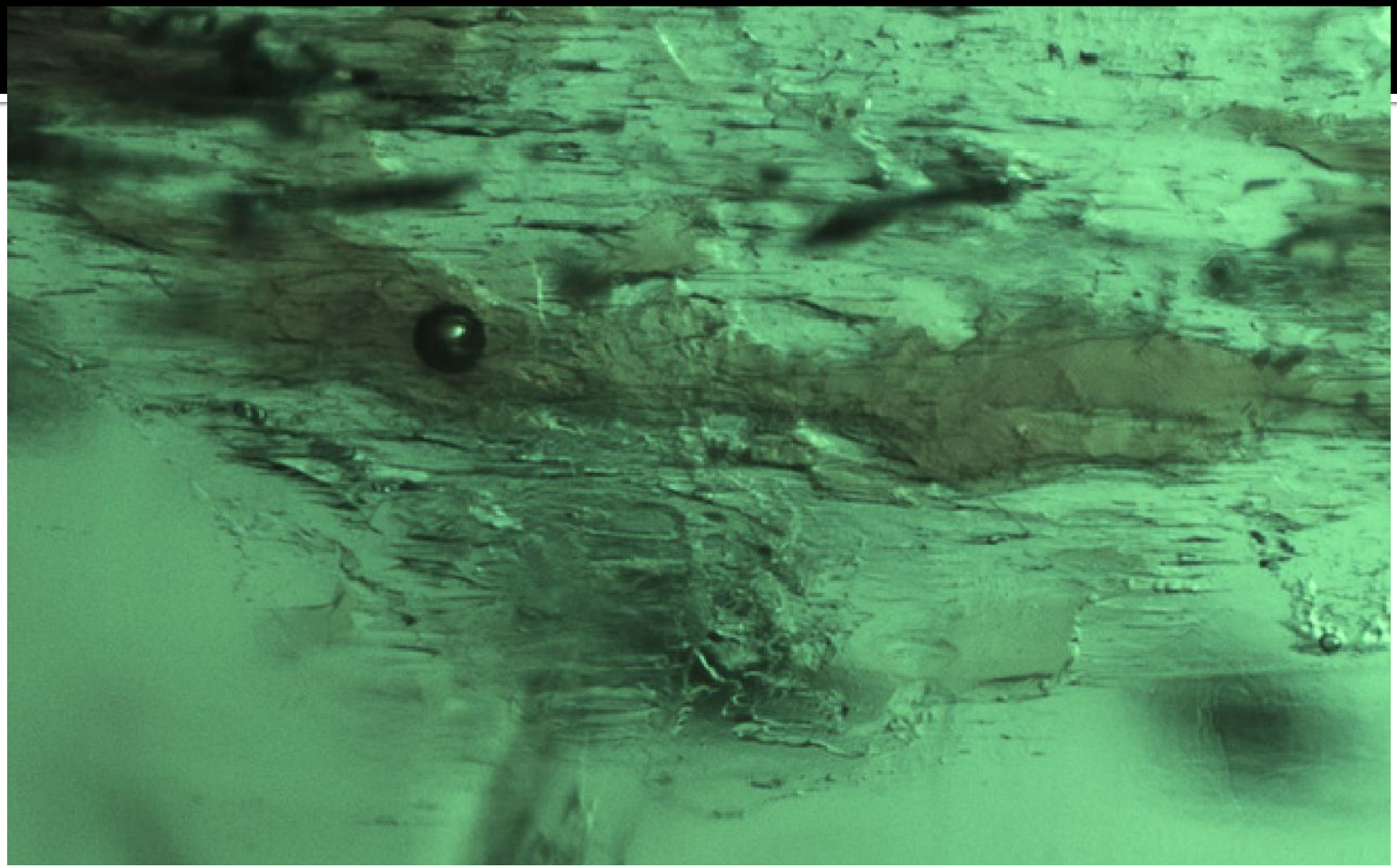
Treated



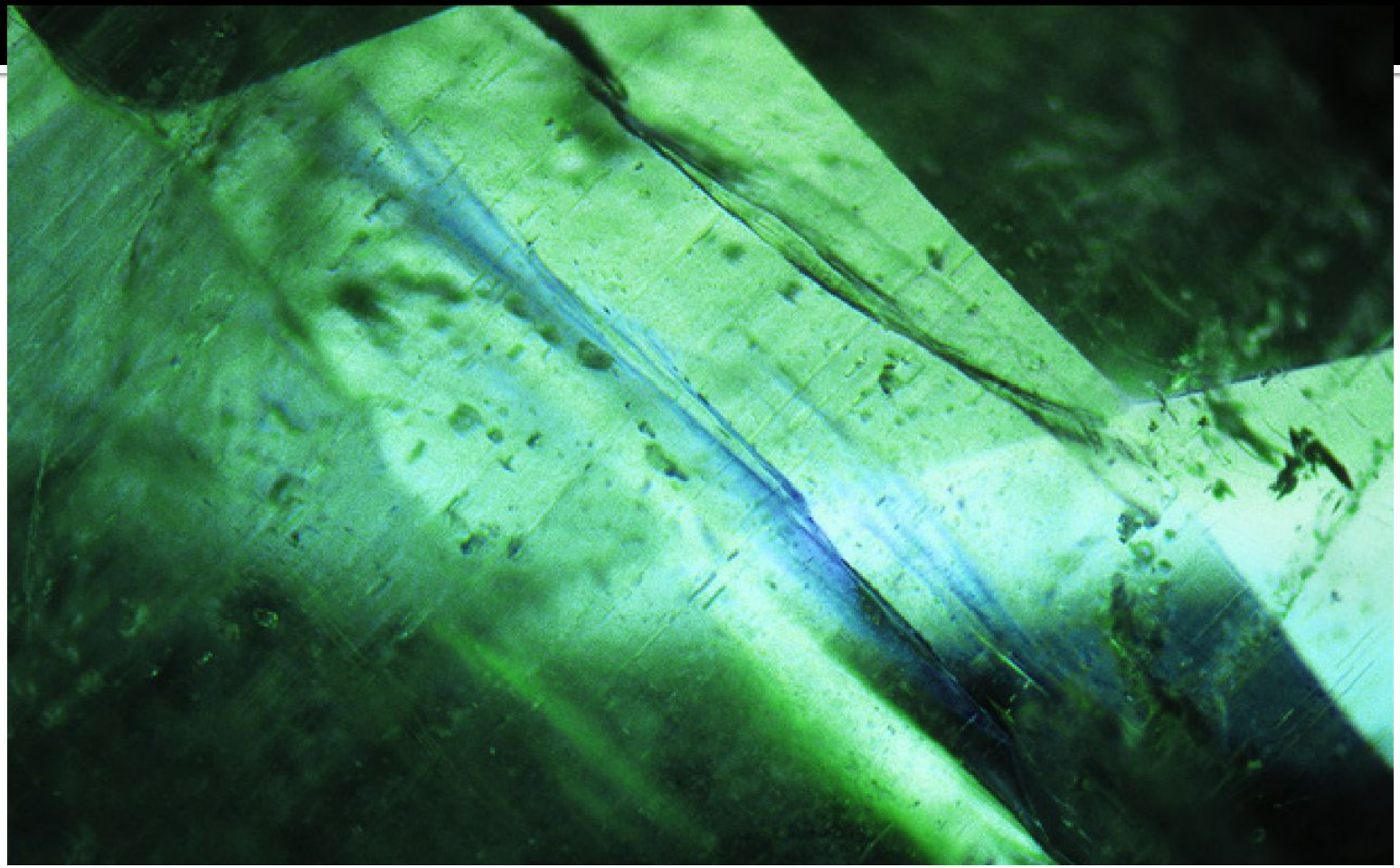
Clarity-enhancing resin showing a flow structure is present in the fracture of a natural emerald. Field of view 3.75 mm.



A partially filled fracture shows vibrant interference colors in the unfilled areas and a dendritic pattern where the oil filler has wicked into the fracture, reducing its visibility. Field of view 6.40 mm.



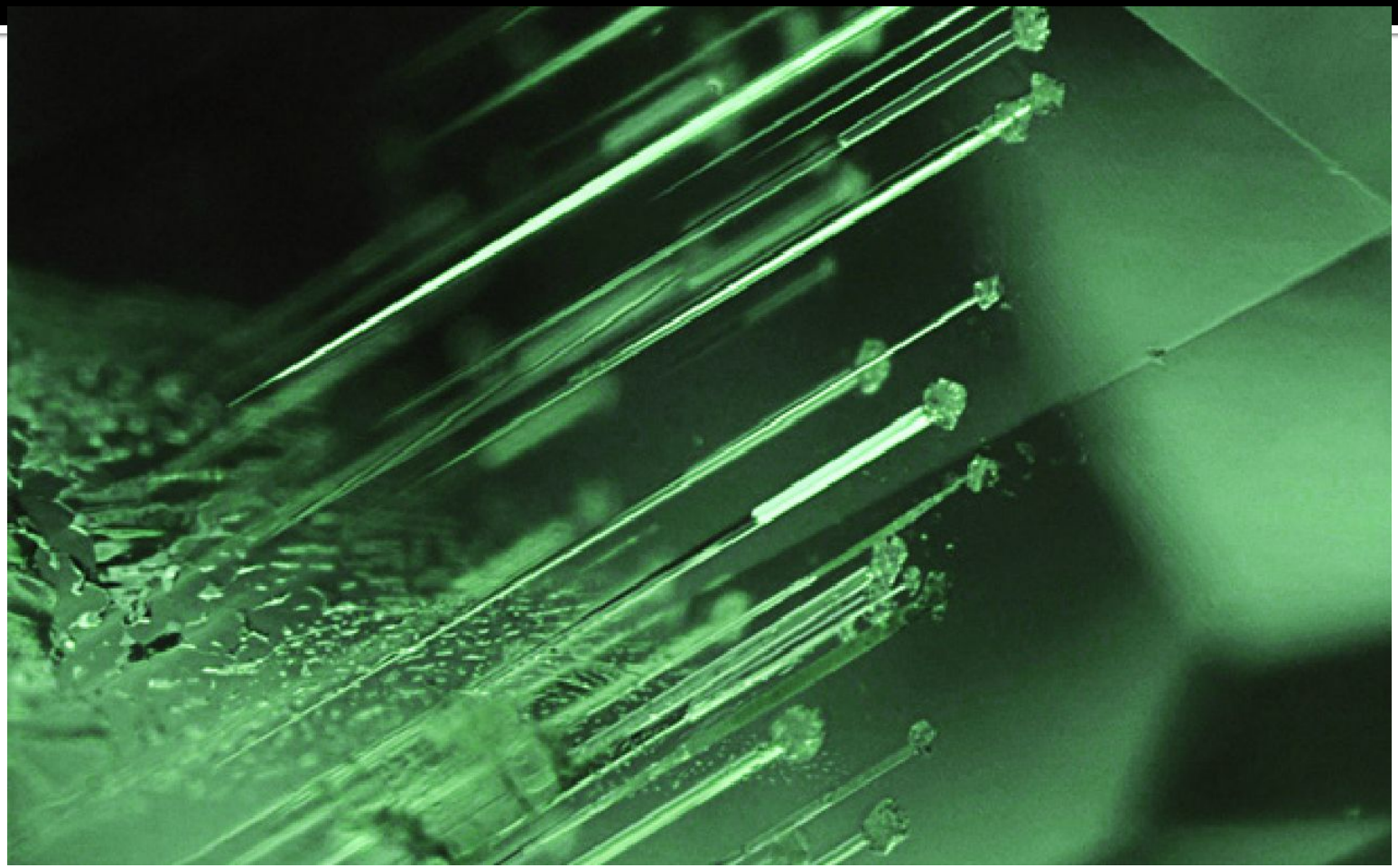
A large pocket filled with brown oil and a trapped gas bubble in a natural emerald. Field of view 1.72 mm.



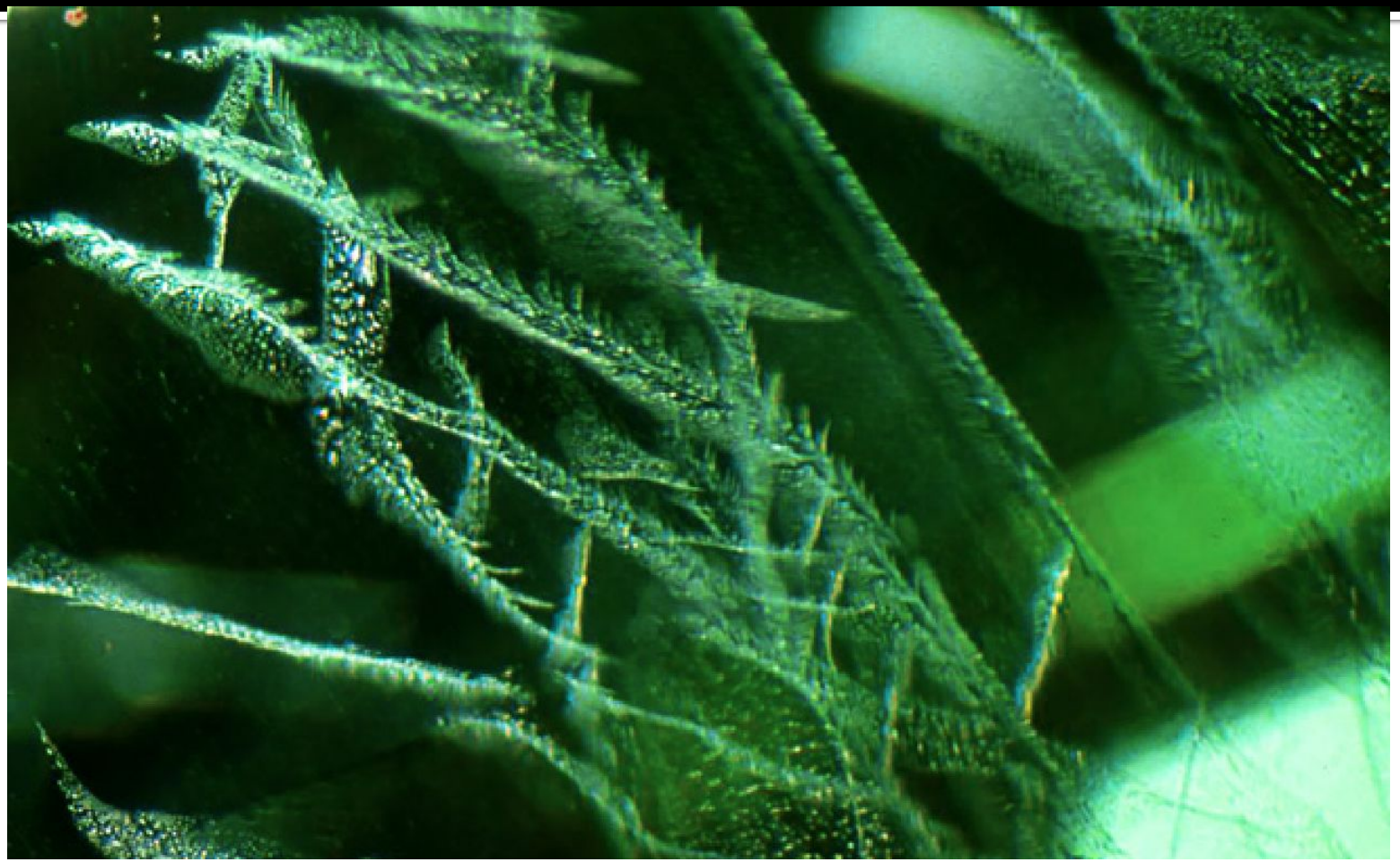
A well-filled fracture displays the diagnostic blue flash effect, which confirms clarity enhancement. Field of view 2.50 mm.

Gentle heating along a surface-reaching fracture causes oil to bead on the surface, proving the emerald is clarity enhanced. Field of view 1.72 mm.

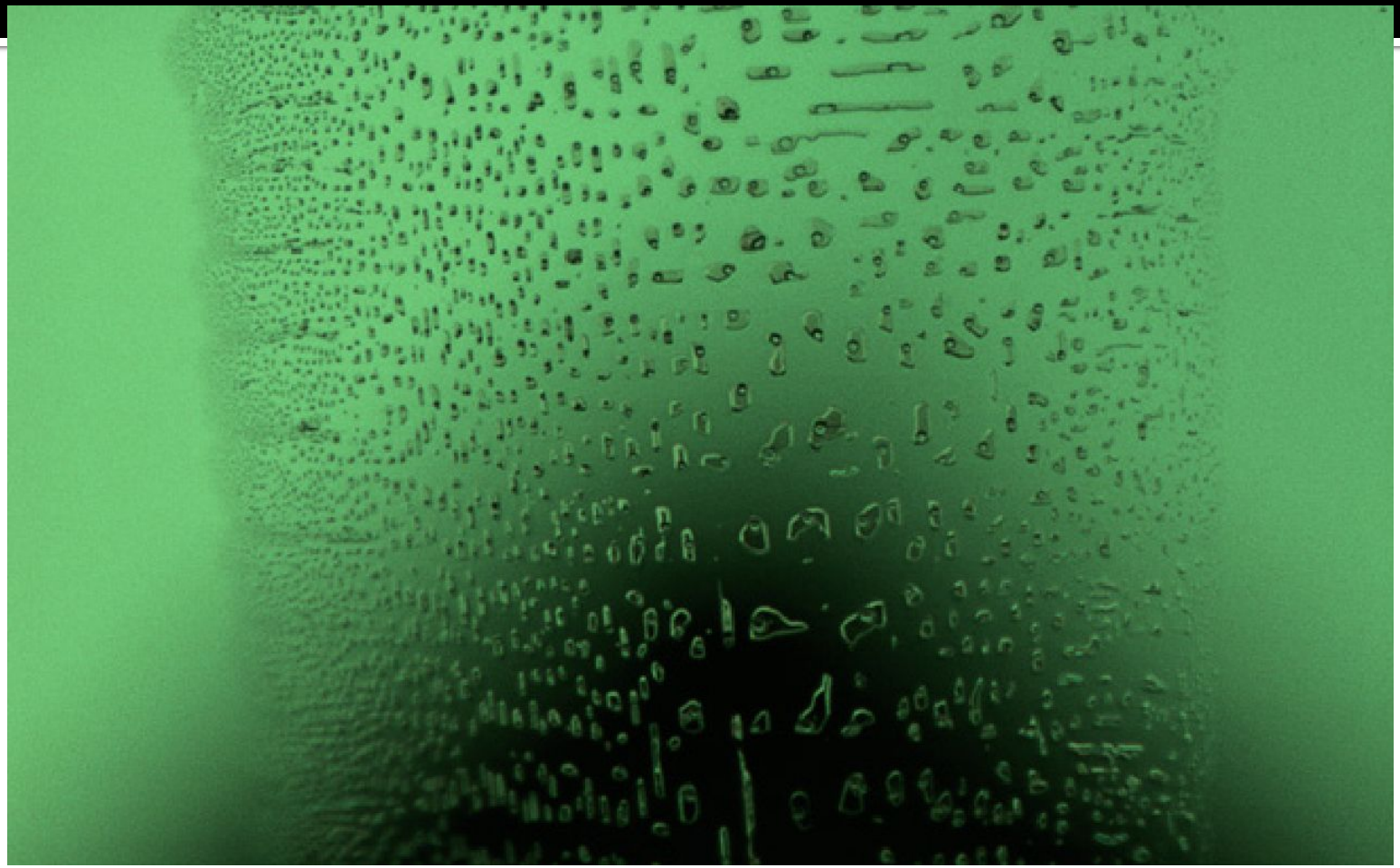
Synthetic



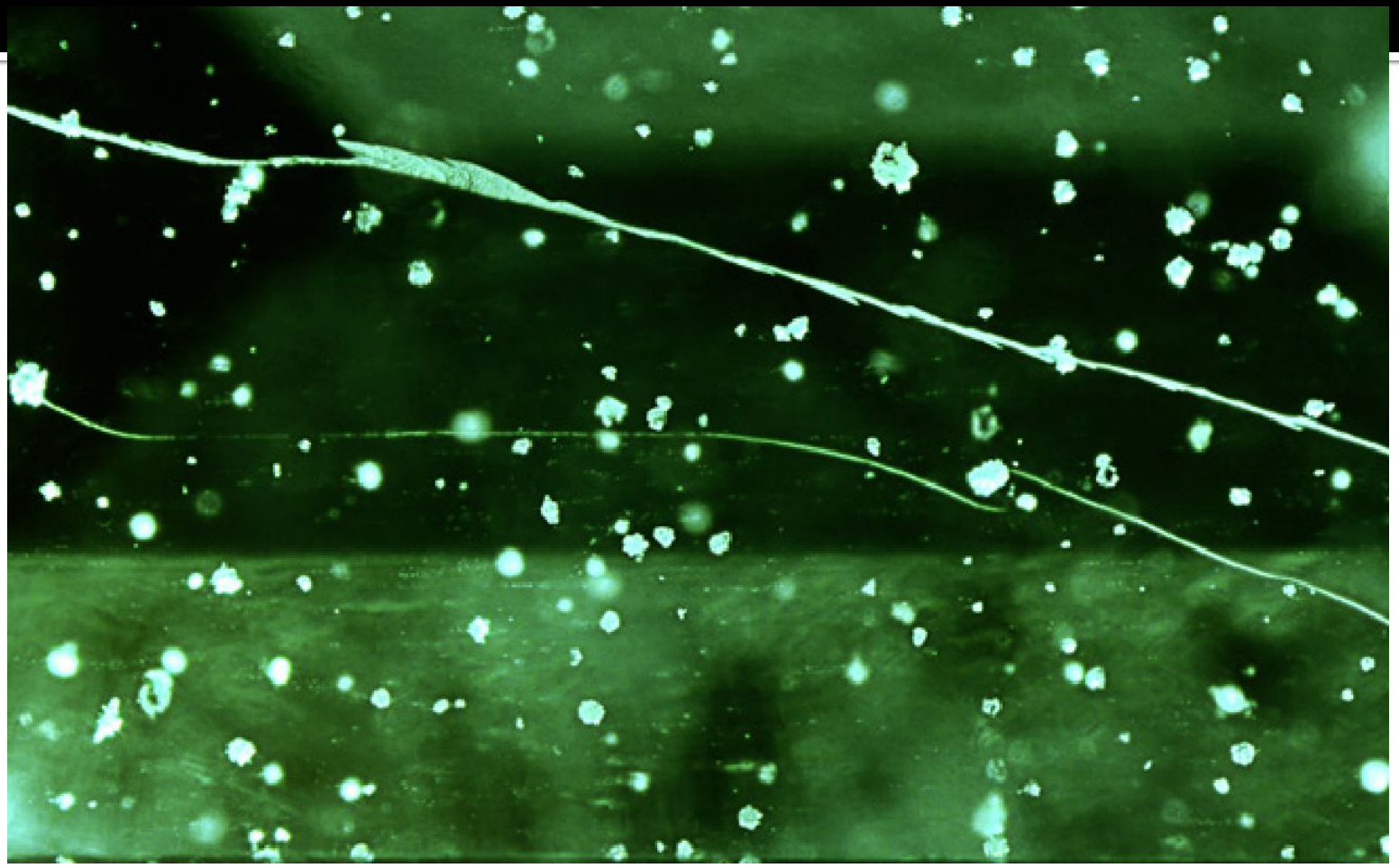
Nail-head spicules, as seen in this Regency hydrothermal synthetic
emerald, are indicative of synthetic origin. Field of view 1.42 mm.



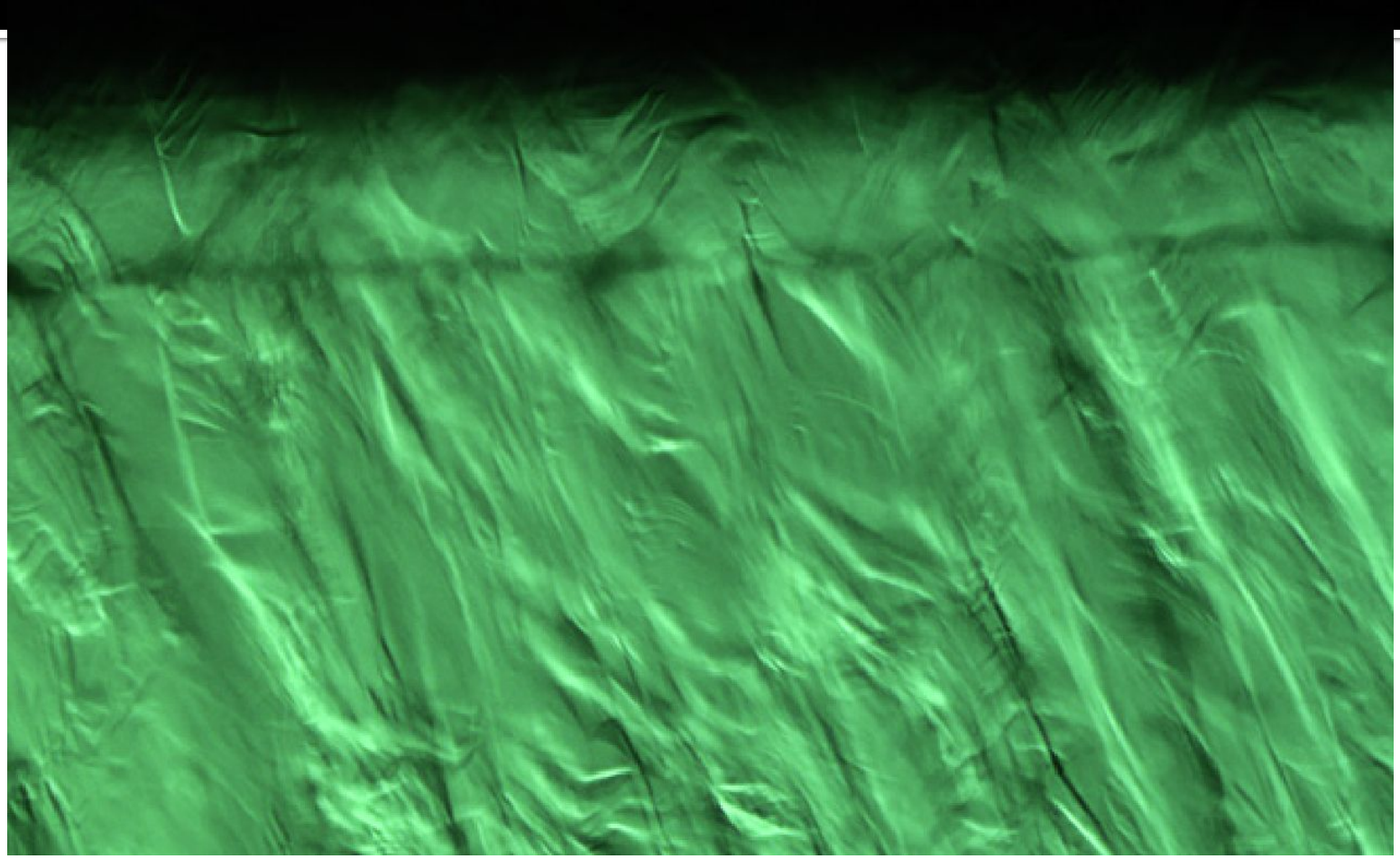
Healed whitish feather-like inclusions of flux residue are present in this Gilson synthetic emerald. Field of view 4.75 mm.



Flux residue often contains a contraction bubble, as seen in each of these trapped flux droplets. Field of view 1.08 mm



Synthetic phenakite crystals are often a by-product of synthetic emerald
growth and can easily be mistaken for natural inclusions. Field of



This roiled, chevron-like growth is characteristic of hydrothermally
grown synthetic emeralds. Field of view 1.72 mm.

MICRO-FEATURES OF EMERALD

- This chart contains a selection of photomicrographs of natural, synthetic, and treated emeralds. It is by no means comprehensive. The images show the visual appearance of numerous features a gemologist might observe when viewing emeralds with a microscope.
- Published in conjunction with Nathan D. Renfro, John I. Koivula, Jonathan Muyal, Shane F. McClure, Kevin Schumacher, and James E. Shigley (2016), "Inclusions in Natural, Synthetic, and Treated Emerald," Gems & Gemology, Vol. 52, No. 4, pp. 402–403. Photomicrographs by Nathan D. Renfro, John I. Koivula, and Jonathan Muyal.
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