

# AUGITE

*Chemical formula:*  $(\text{Ca}, \text{Mg}, \text{Fe}^{2+}, \text{Ti}, \text{Al})_2[(\text{Si}, \text{Al})_2\text{O}_6]$

(augite is a member of the calcic pyroxene group)

*Crystal system:* monoclinic

*Color in thin section:* colorless, gray, pale green, pale brown, or brownish green; may be

weakly pleochroic with: X = pale green, pale brown, green, yellow-green

Y = pale yellow-green, pale brown, violet

Z = pale green, greyish green, pale brown, violet

*Form:* short columnar crystals, allotriomorphic grains

*Cleavage:* good on {110} – basal cross sections are four or eight sided with two cleavages intersecting at about  $87^\circ$

*Indices of refraction:*  $n_\alpha = 1.671 - 1.735$     $n_\beta = 1.672 - 1.741$     $n_\gamma = 1.703 - 1.774$

*Birefringence:* 0.022 – 0.039

*Optic sign:* biaxial positive

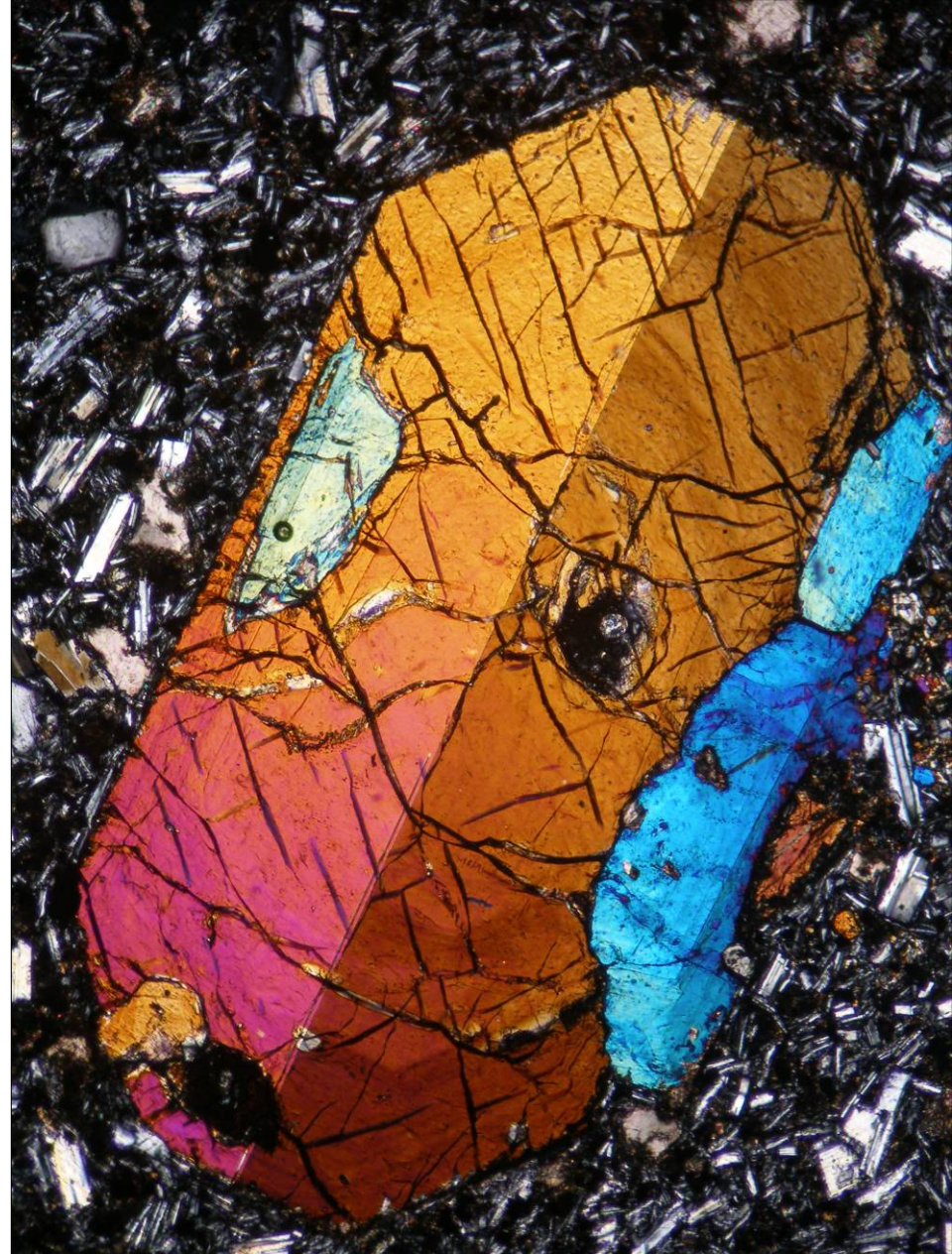
*Alteration:* to uralite (= fine-grained, light-colored amphibole), chlorite, serpentine

*Occurrence:* intermediate and mainly basic magmatites (gabbro, anorthosite, pyroxenite, peridotite, basalt, andesite, also diorite and granodiorite)

*Similar minerals:* amphiboles (cleavage at about  $124^\circ$ ), olivine (higher birefringence, lack of cleavage), other pyroxenes (orthopyroxenes have lower birefringence and parallel extinction)

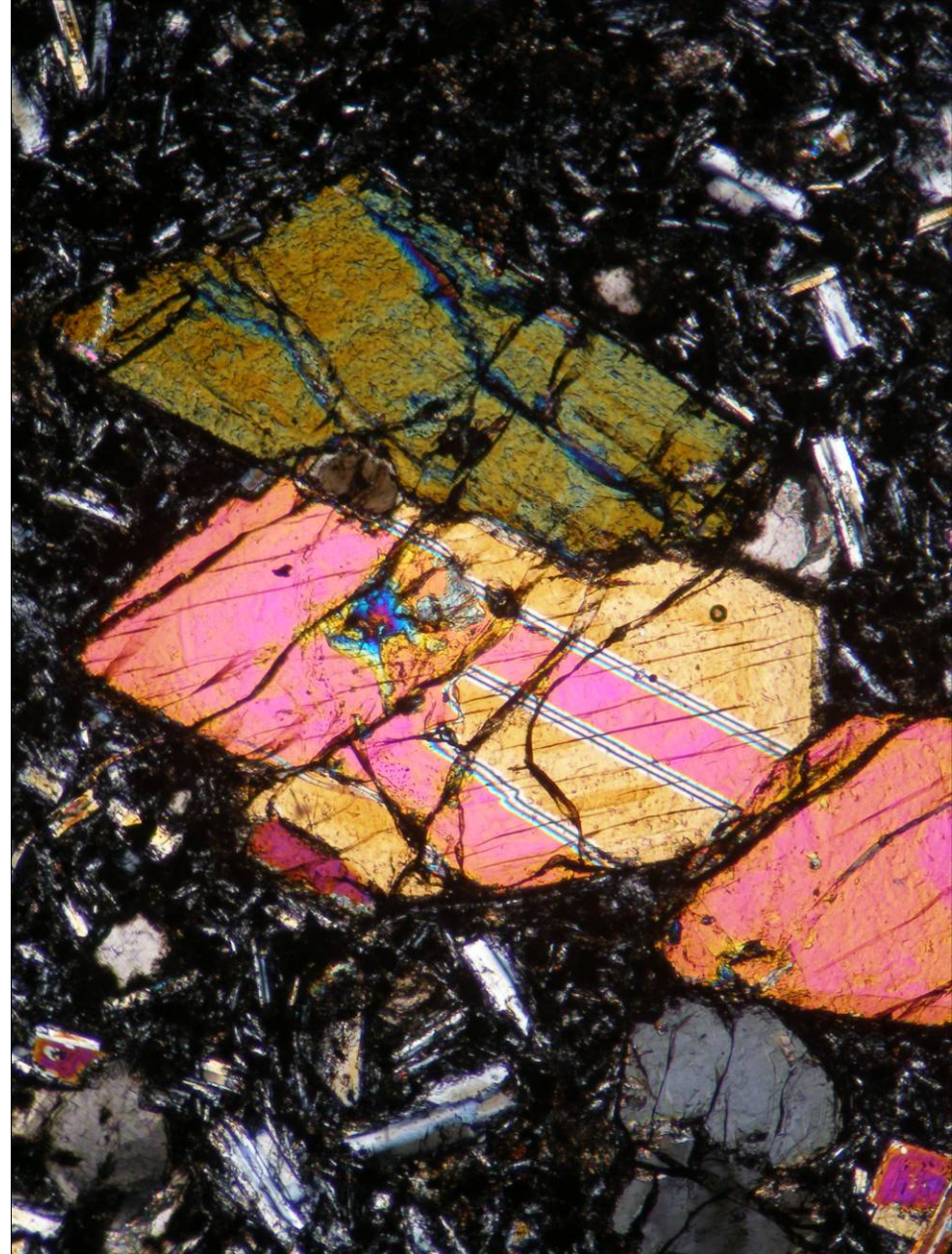
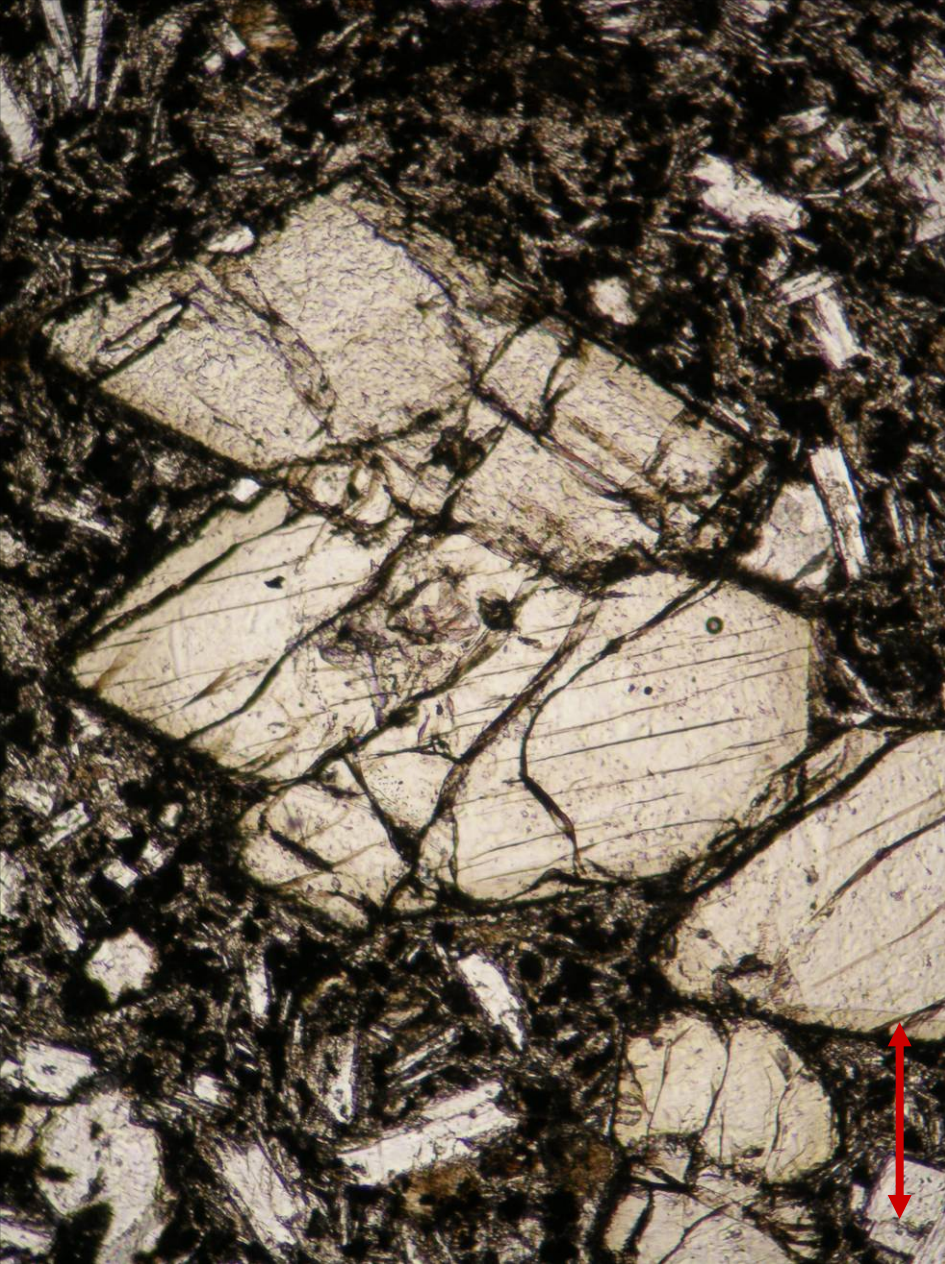
*Note:* color zoning is common, titanaugite often has a distinctive “hourglass” pattern; lamellae of exsolved orthopyroxene are relatively common





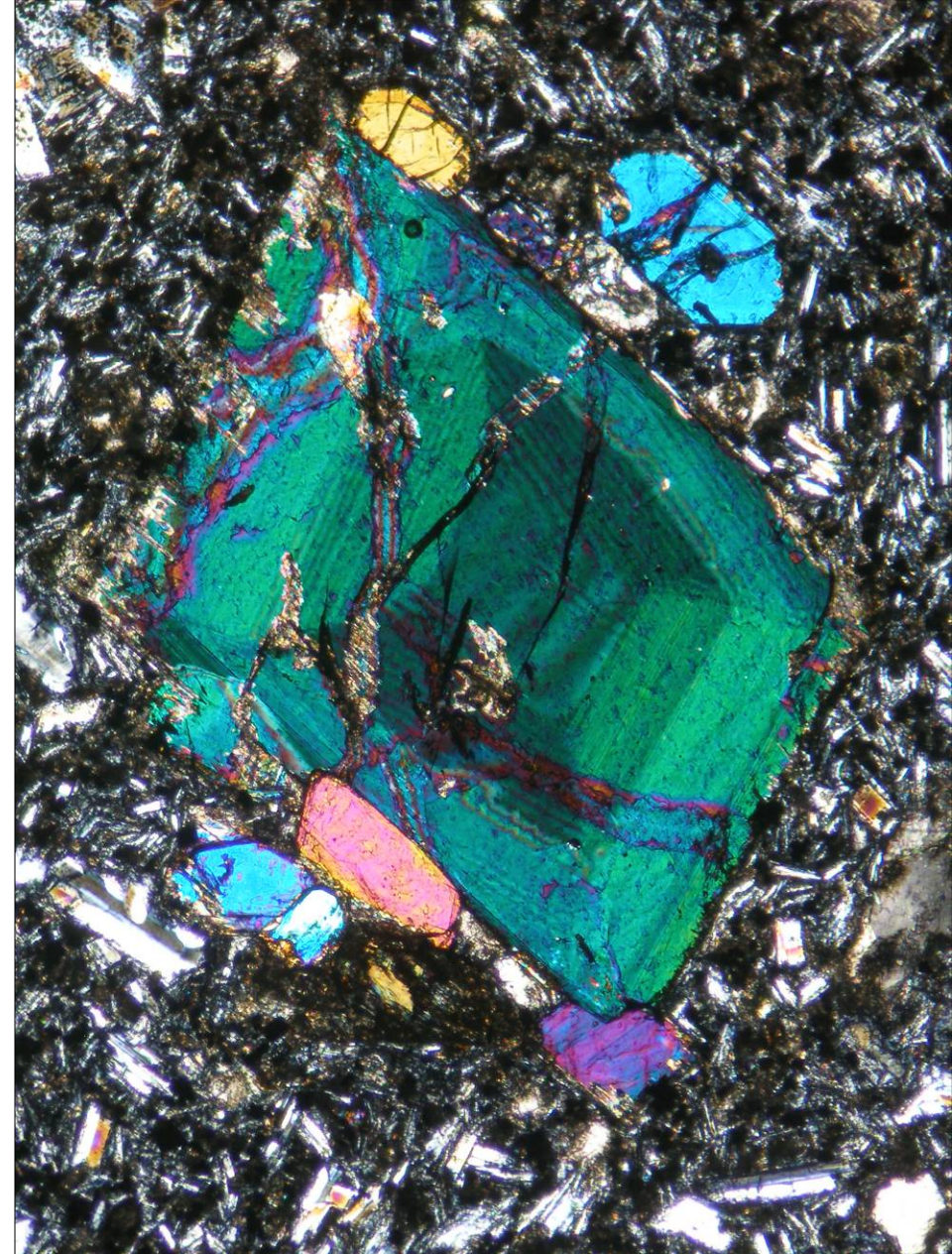
Augite phenocryst in andesite from Bánov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 2.0 mm. Photo: JiZi.





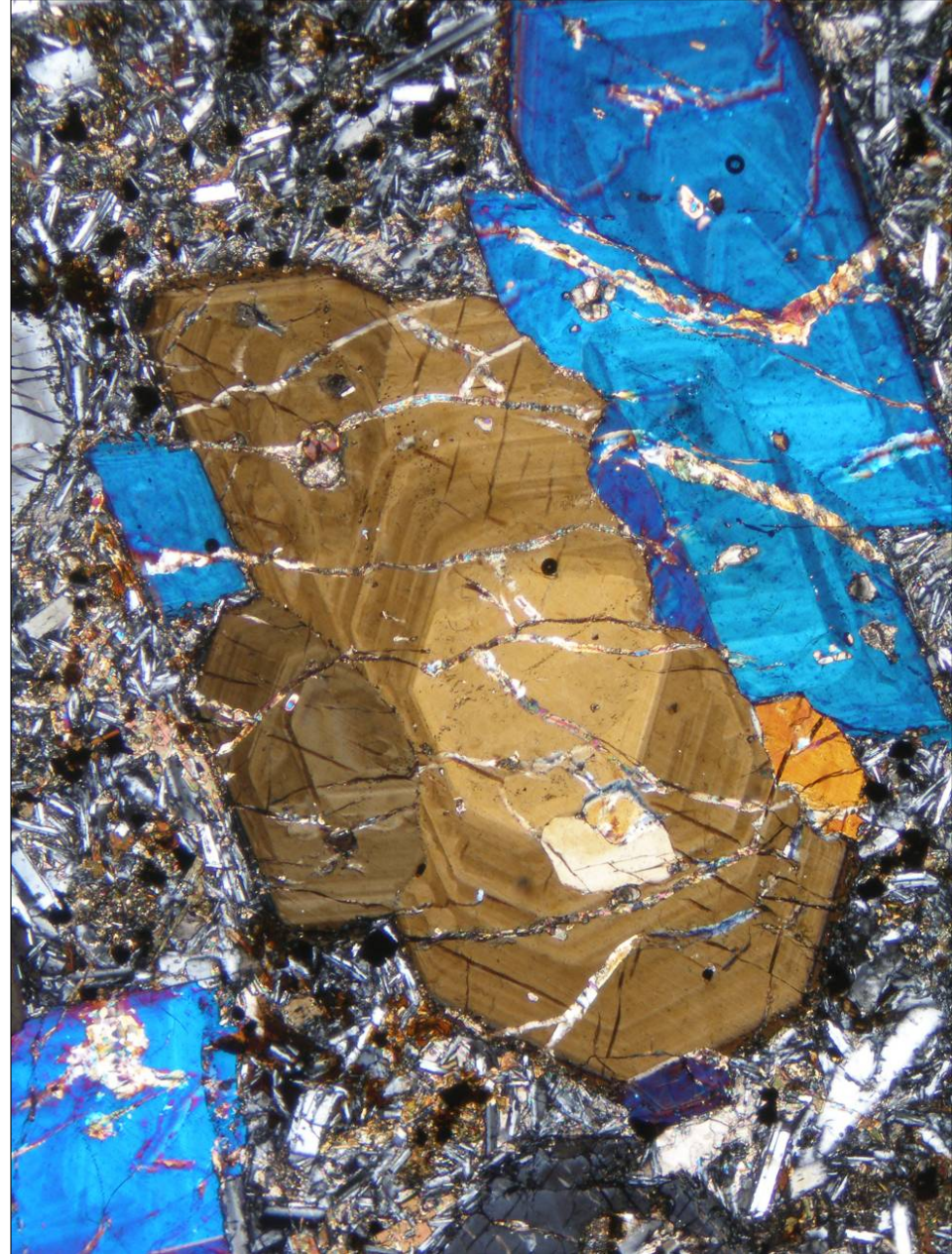
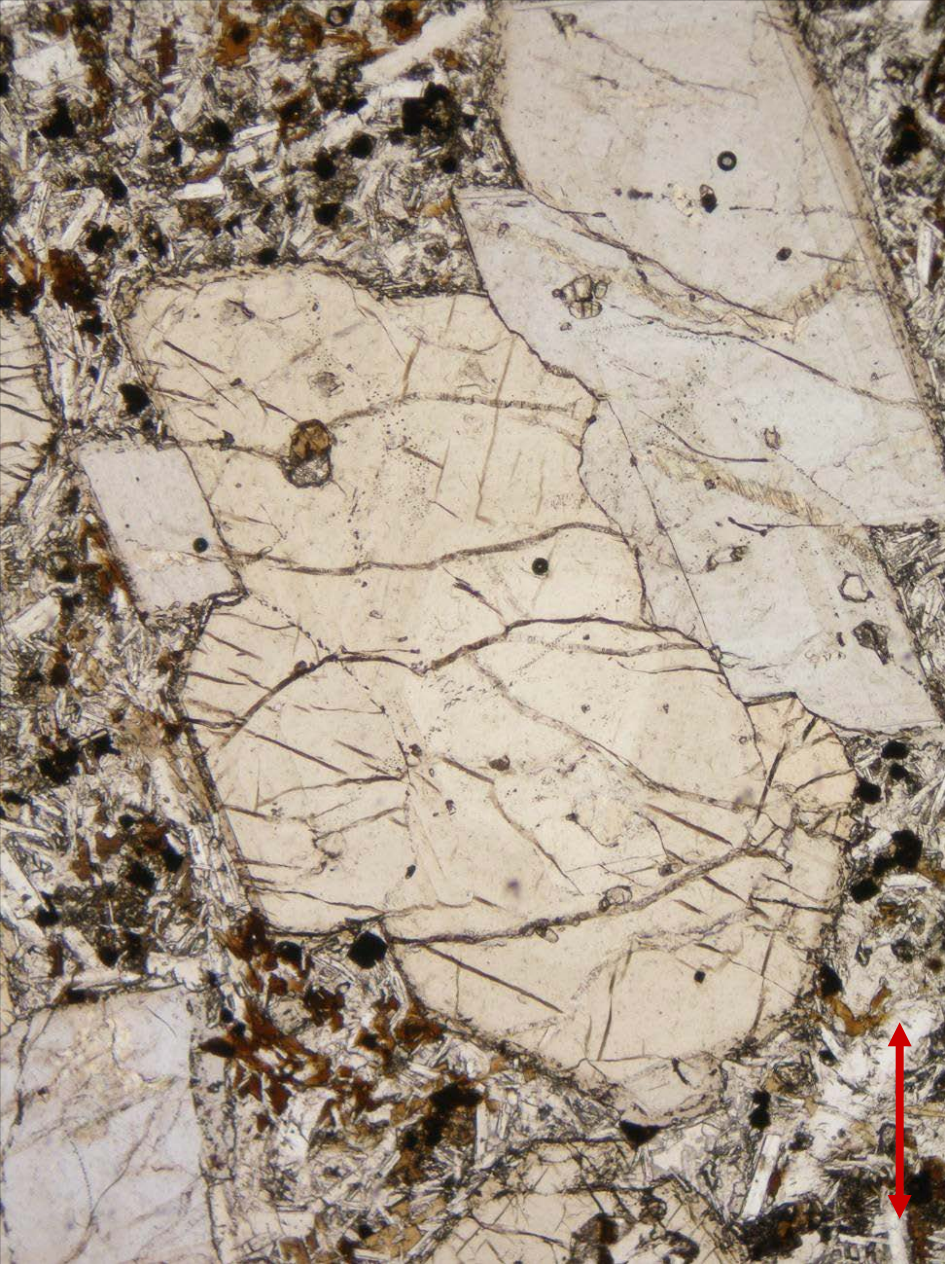
Augite phenocrysts in andesite from Bánov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 2.0 mm. Photo: JiZi.





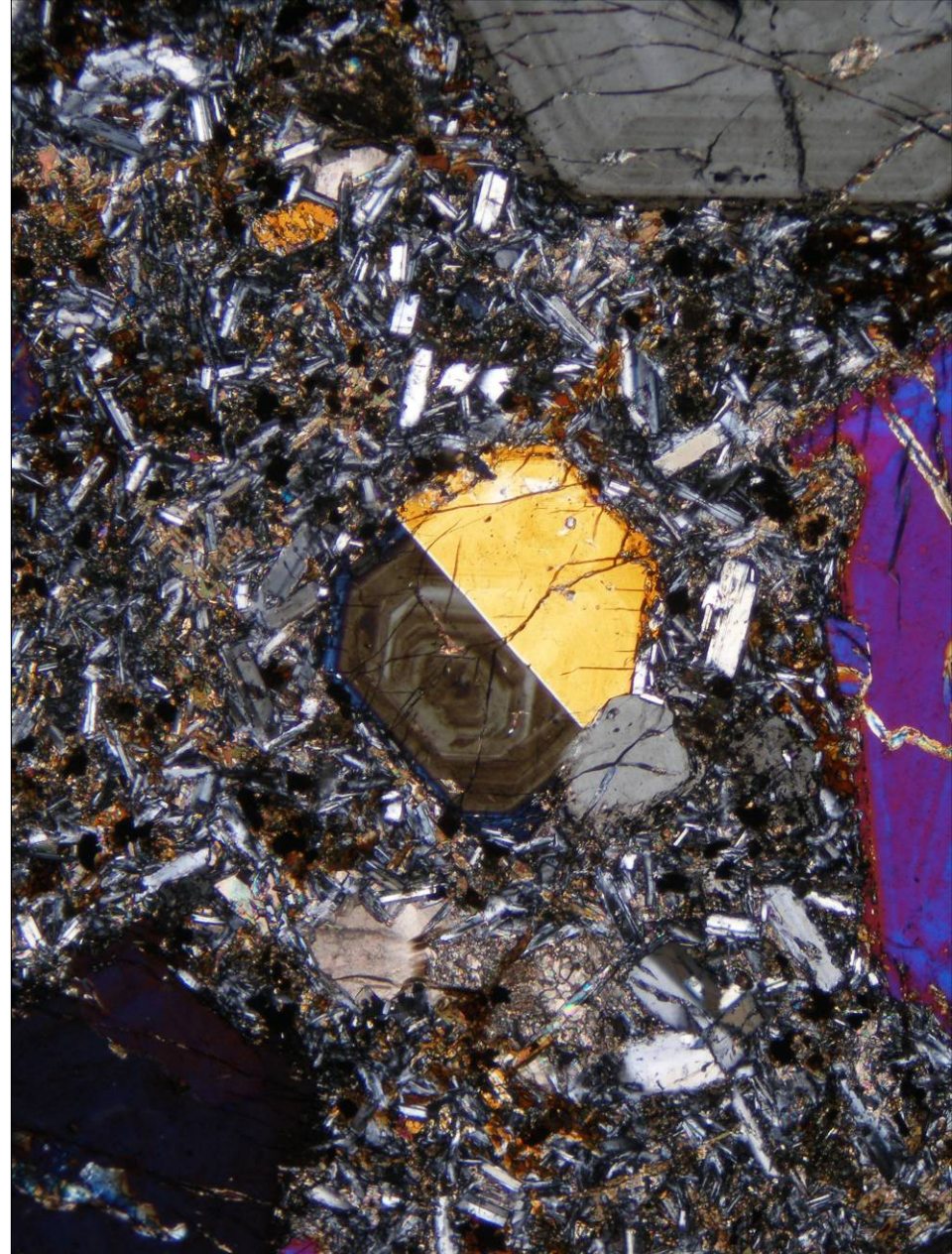
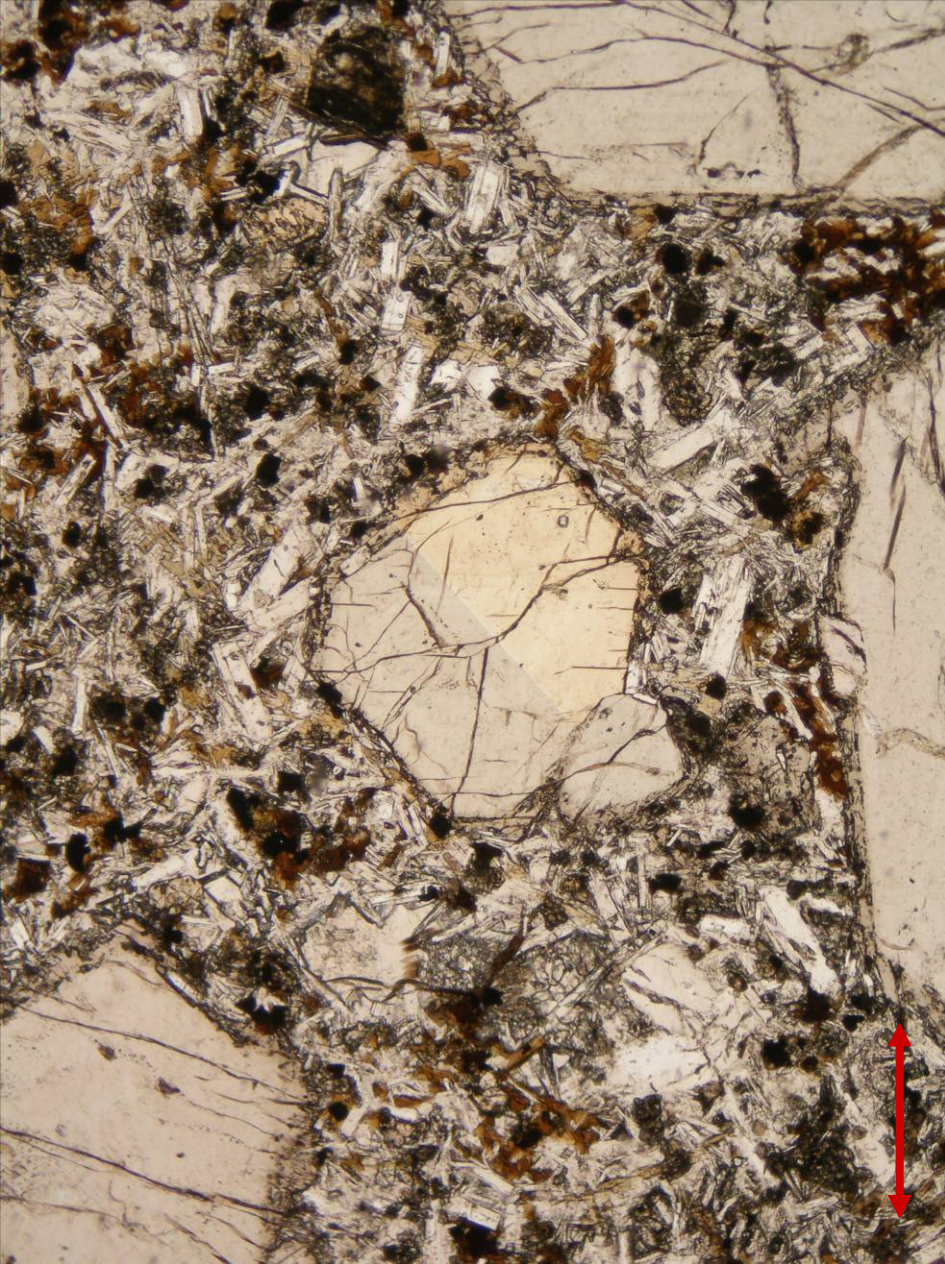
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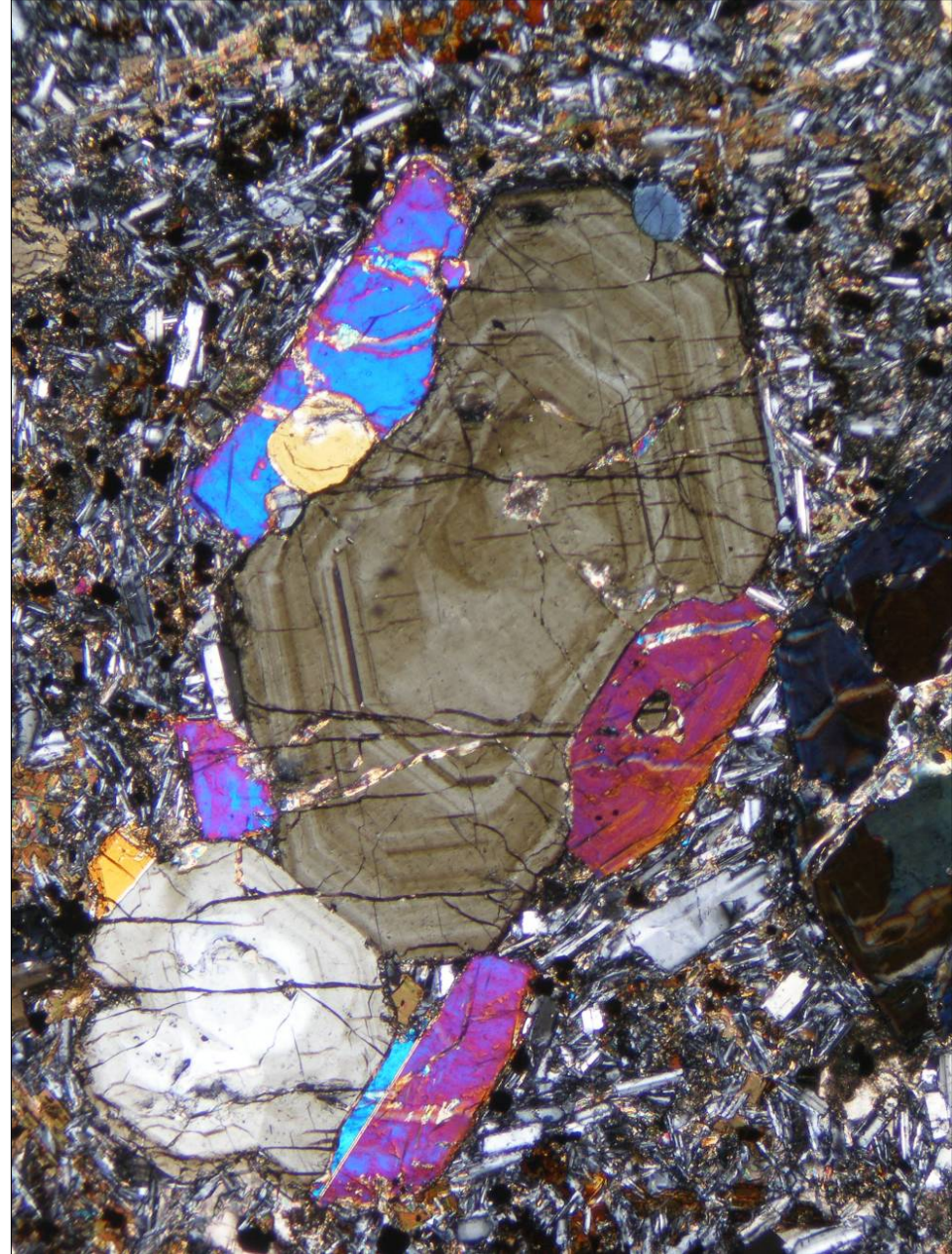
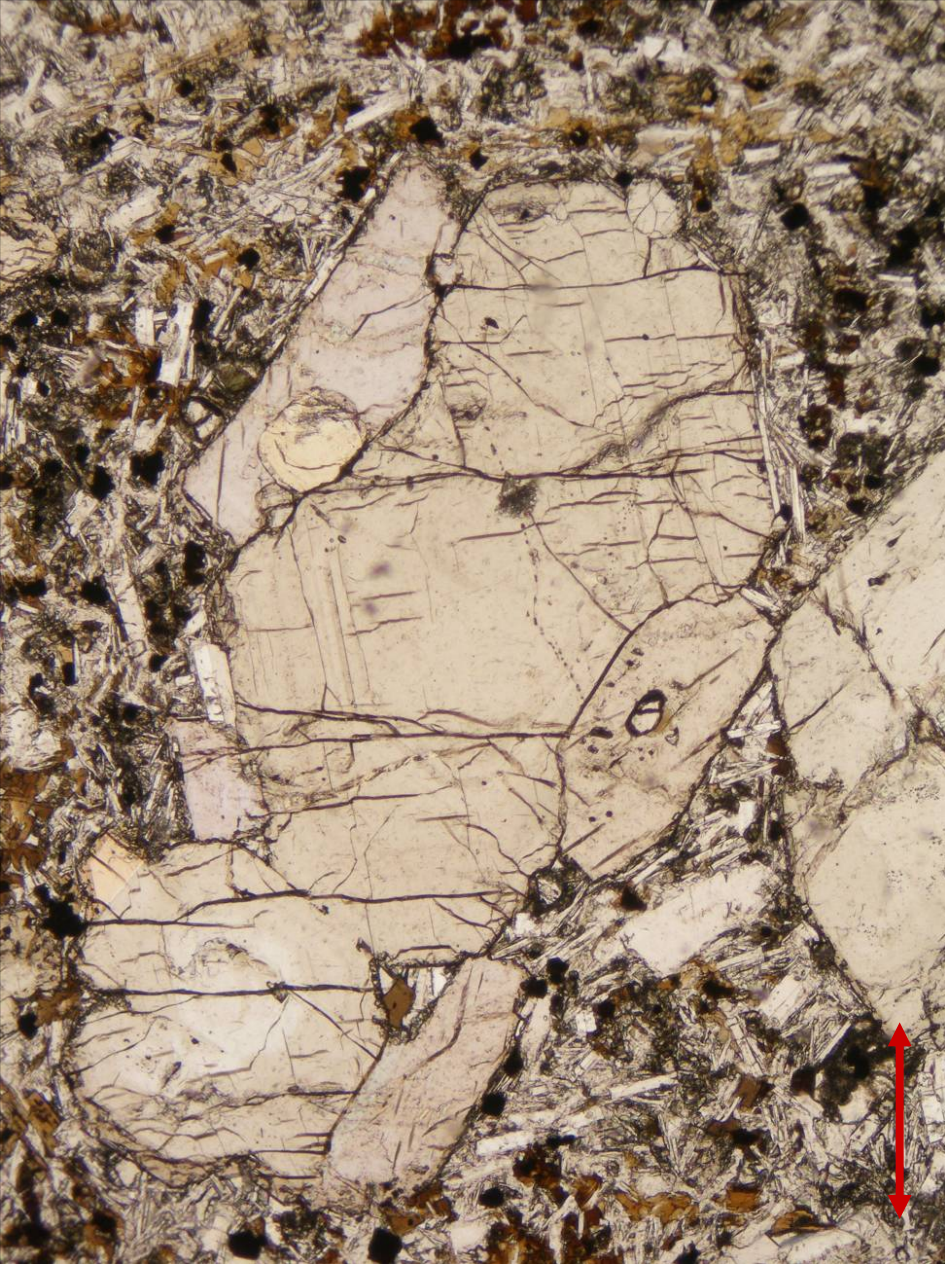
A cluster of augite phenocrysts in basalt from Starý Hrozenkov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.5 mm. Photo: JiZi.





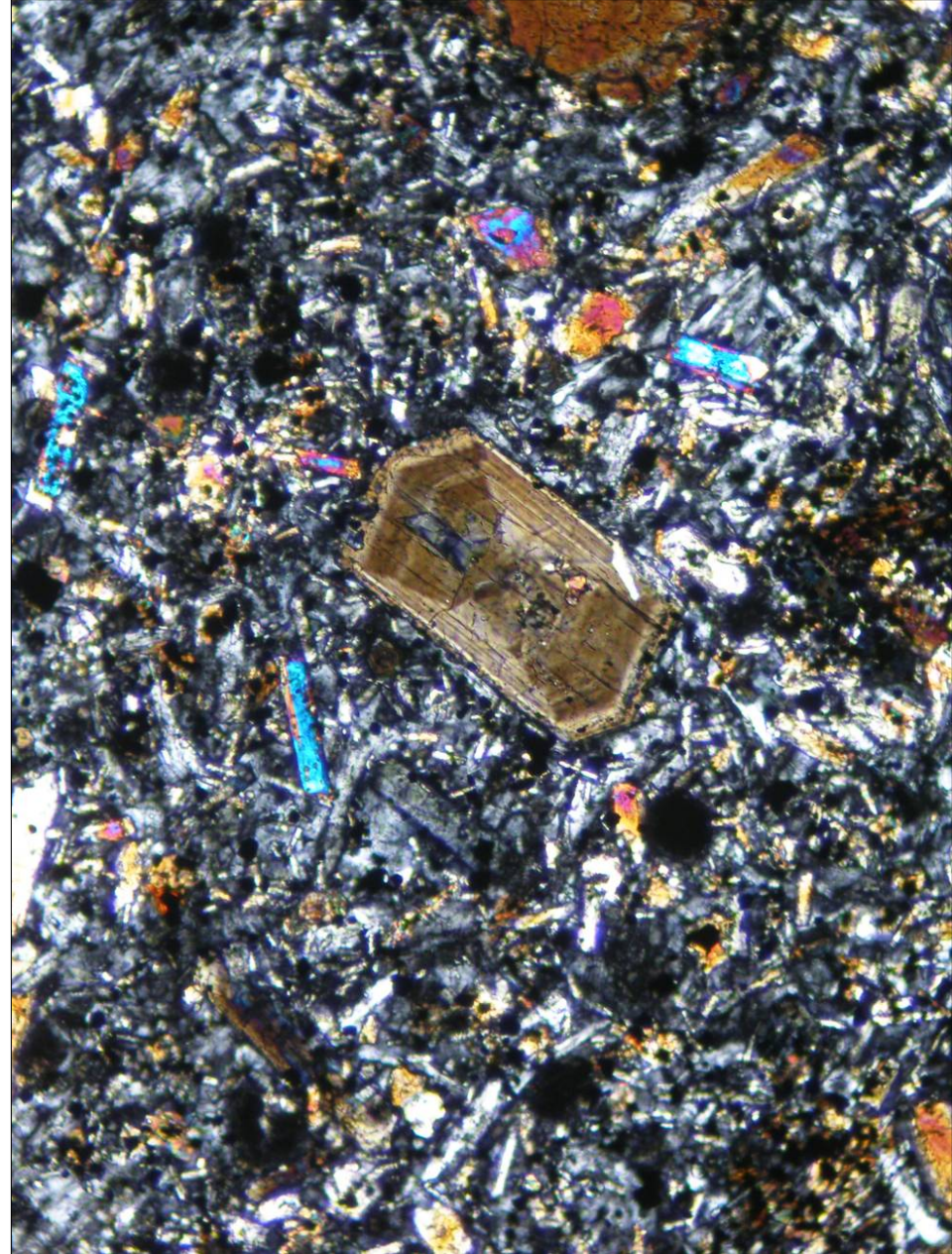
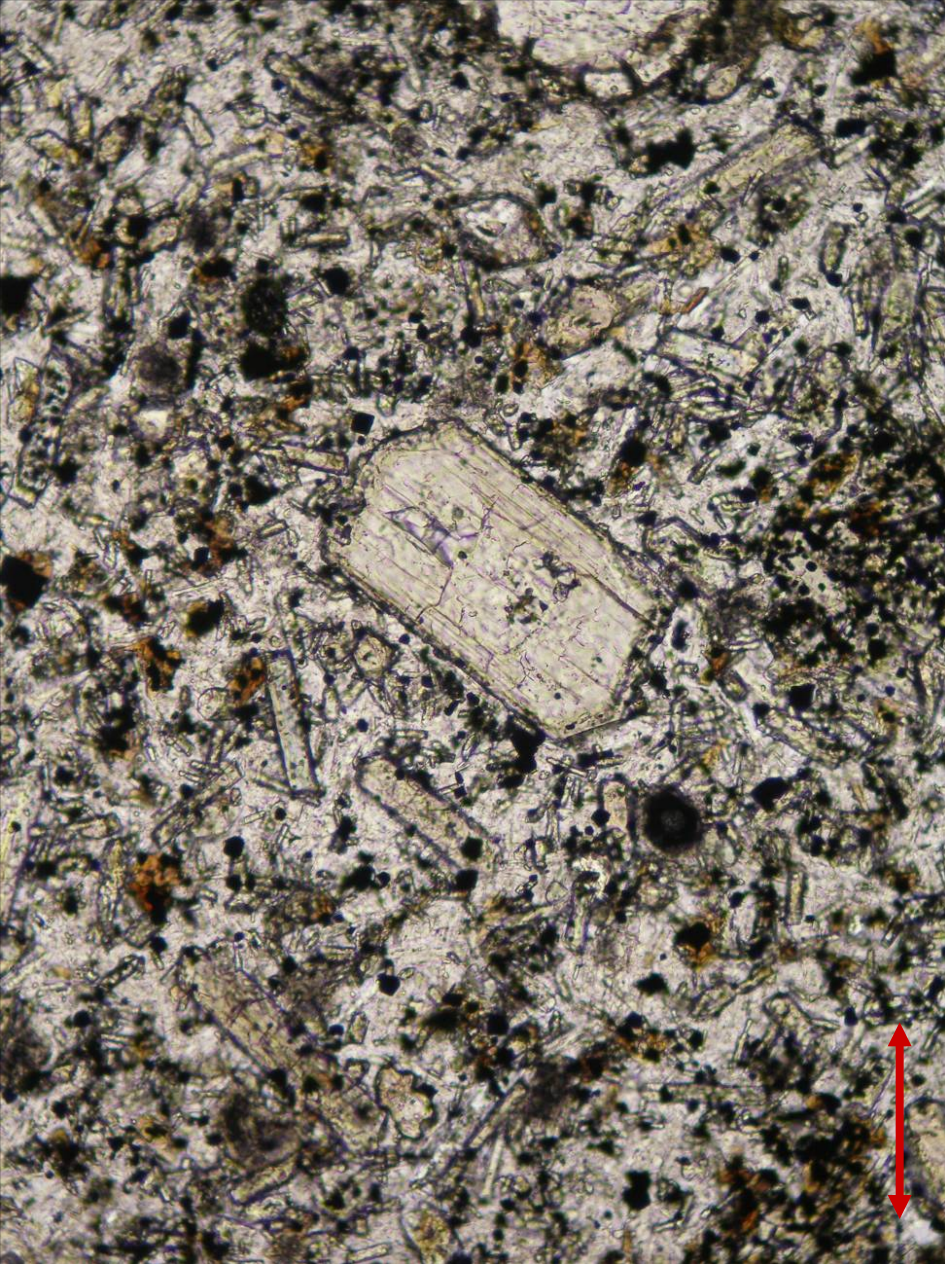
Augite in basalt from Starý Hrozenkov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.5 mm. Photo: JiZi.





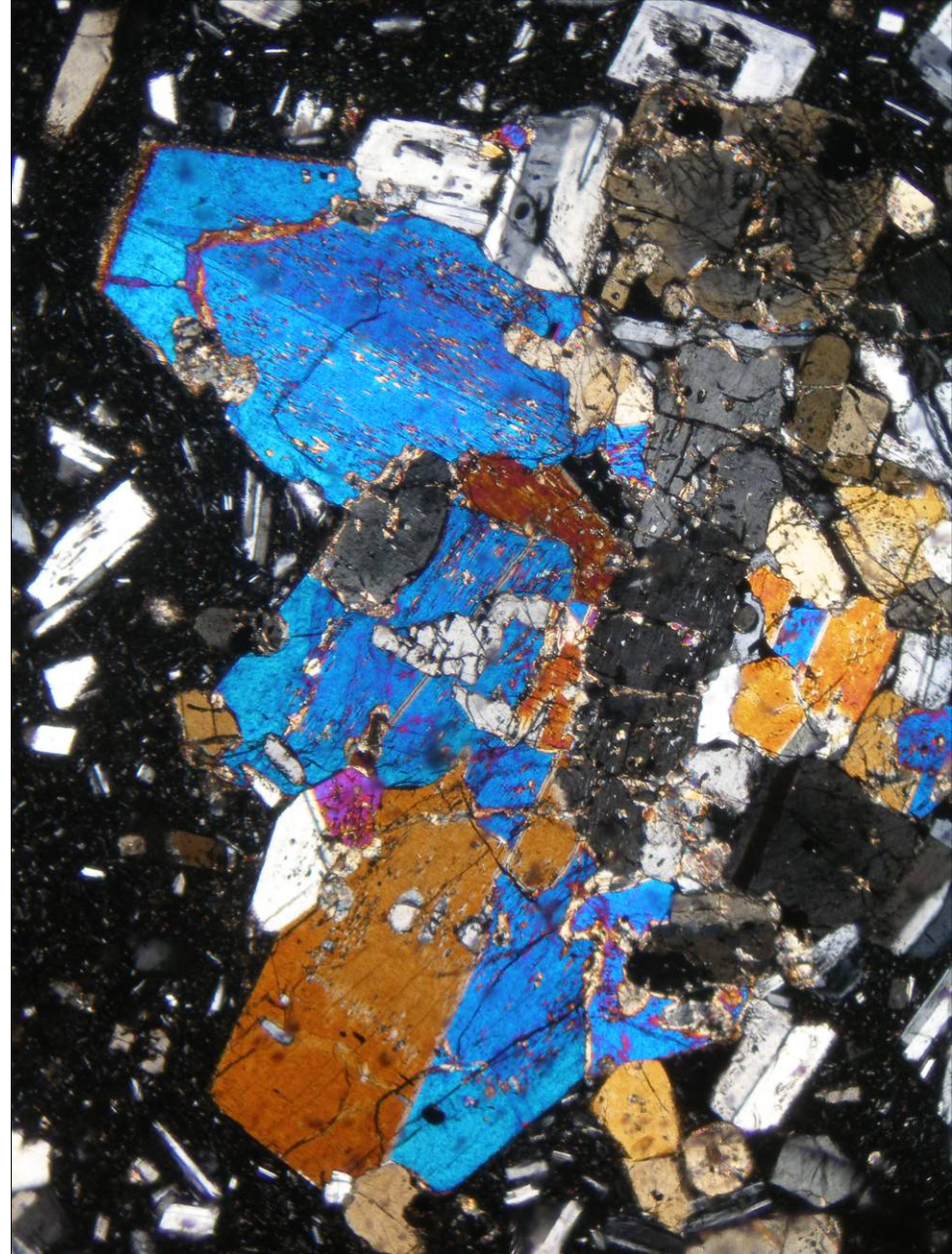
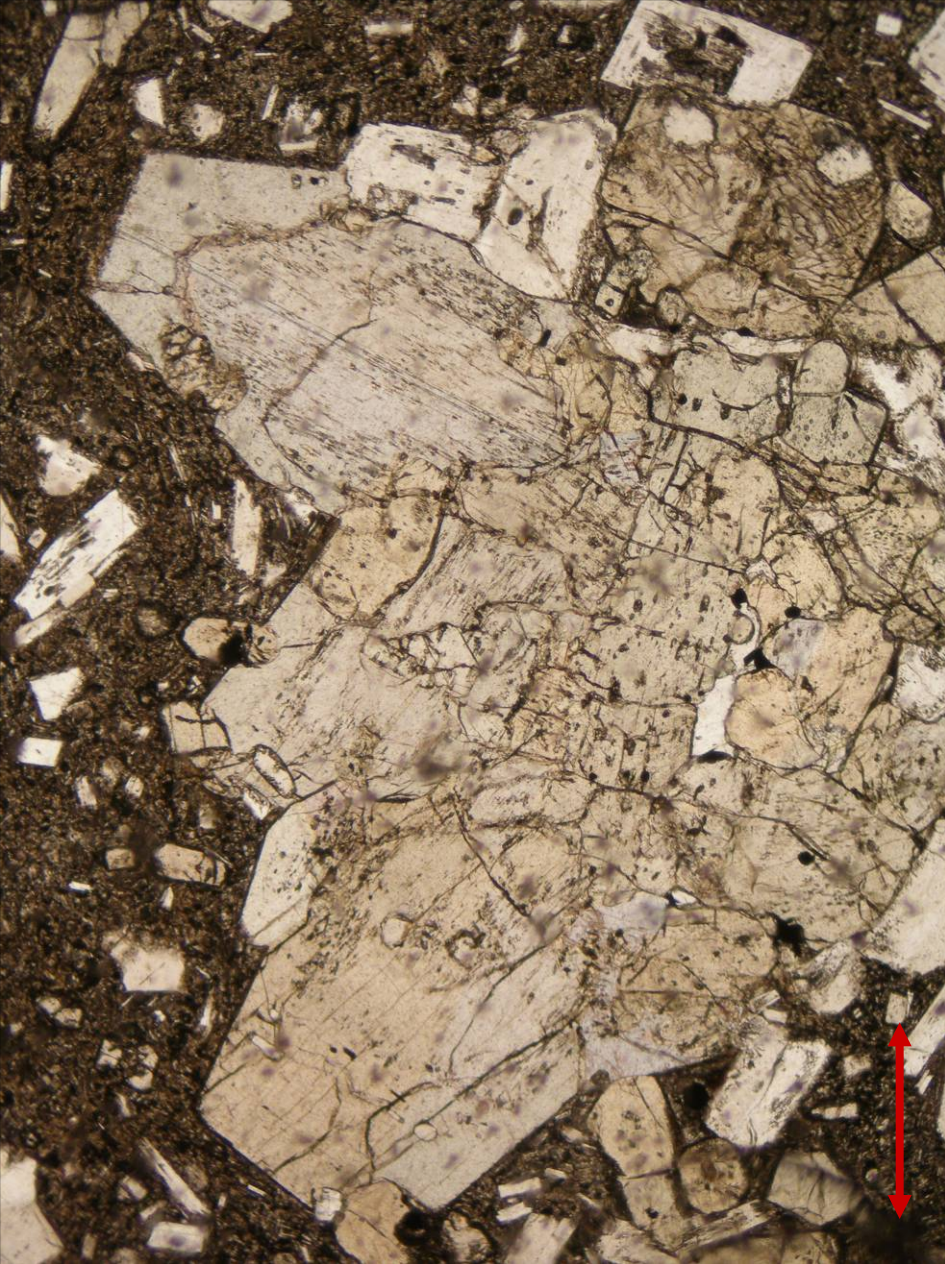
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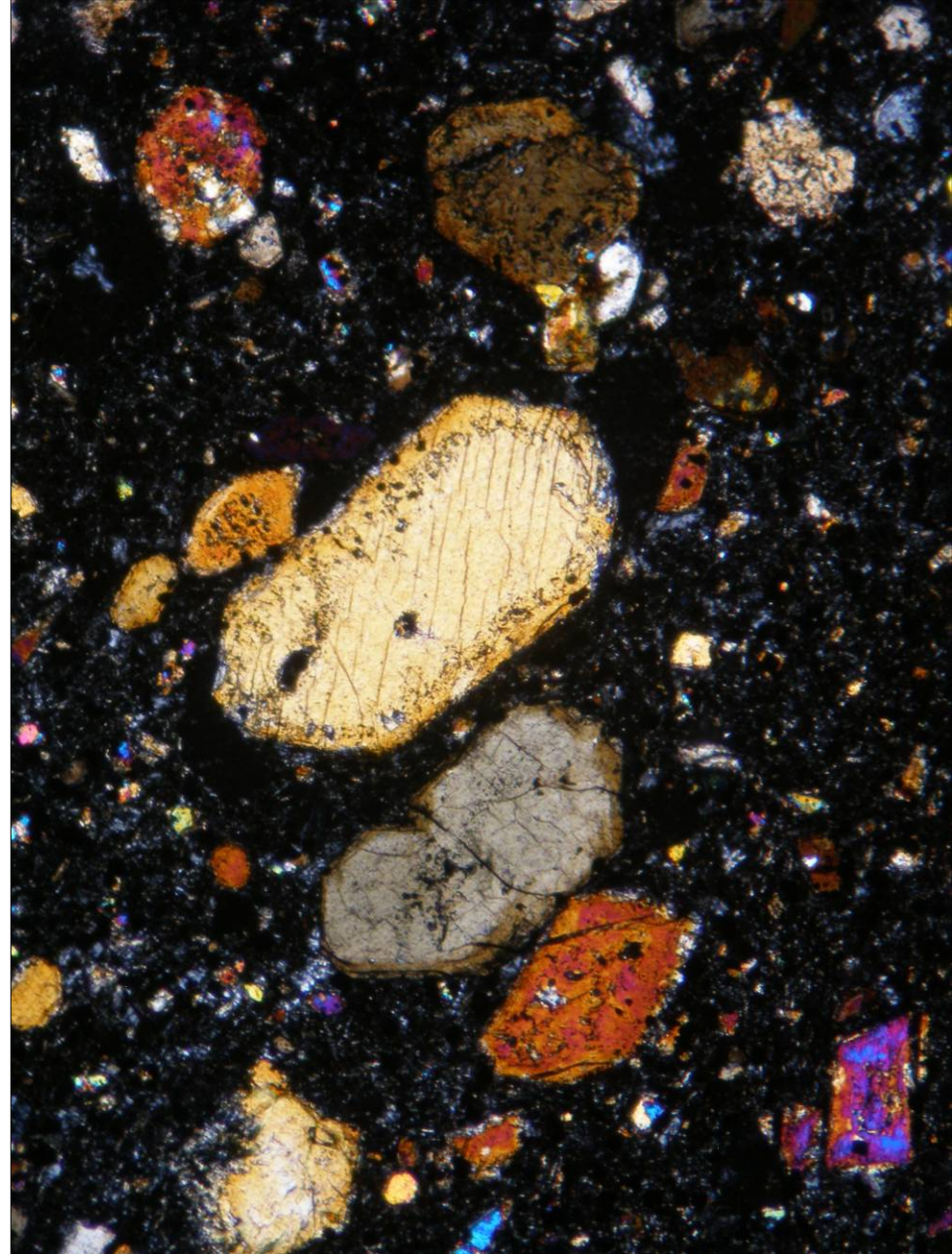
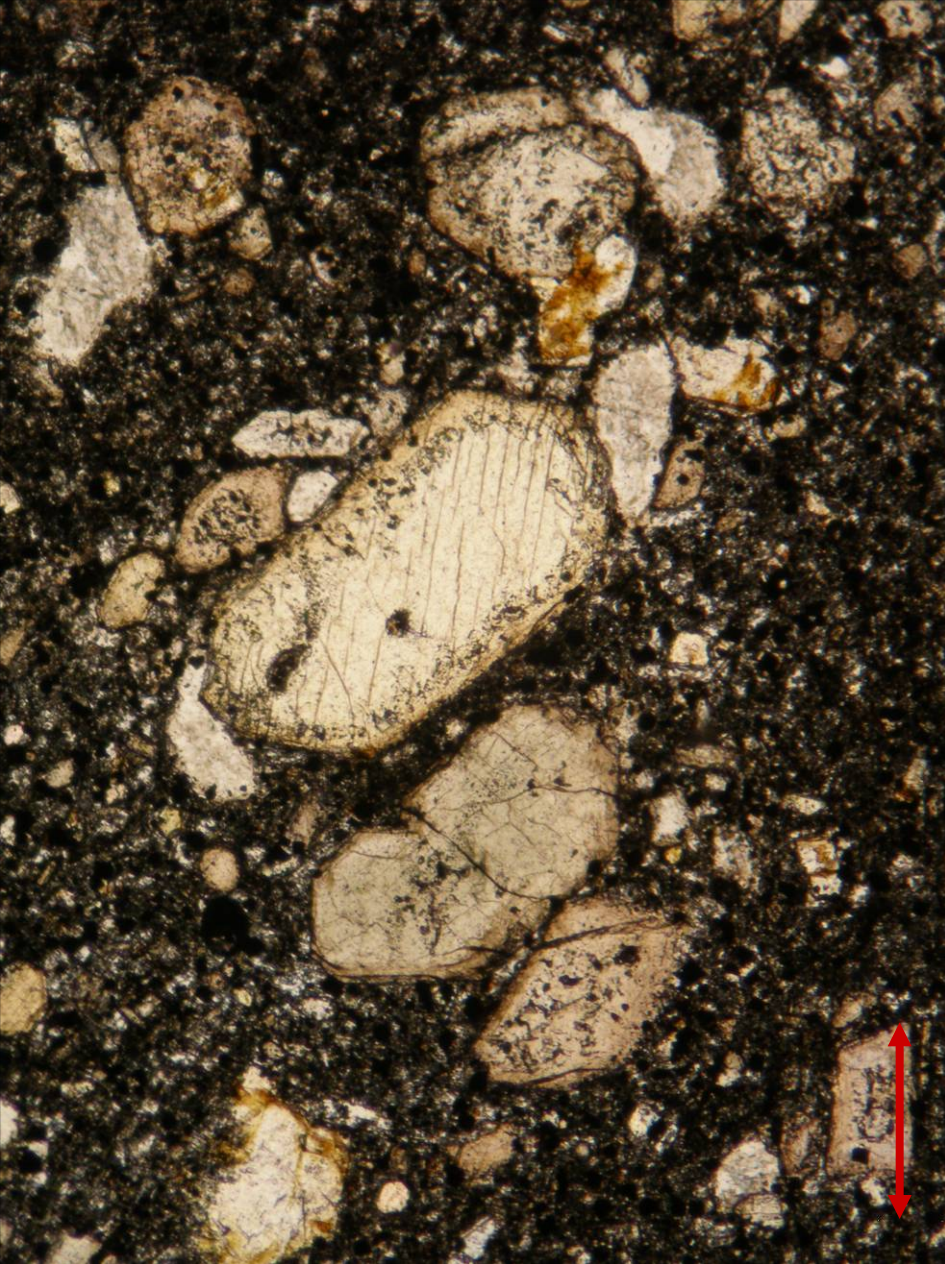
Sector zoning („hourglass“) in a clinopyroxene (probably titanaugite) phenocryst in phonolite from Třebenice, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.5 mm. Photo: JiZi.





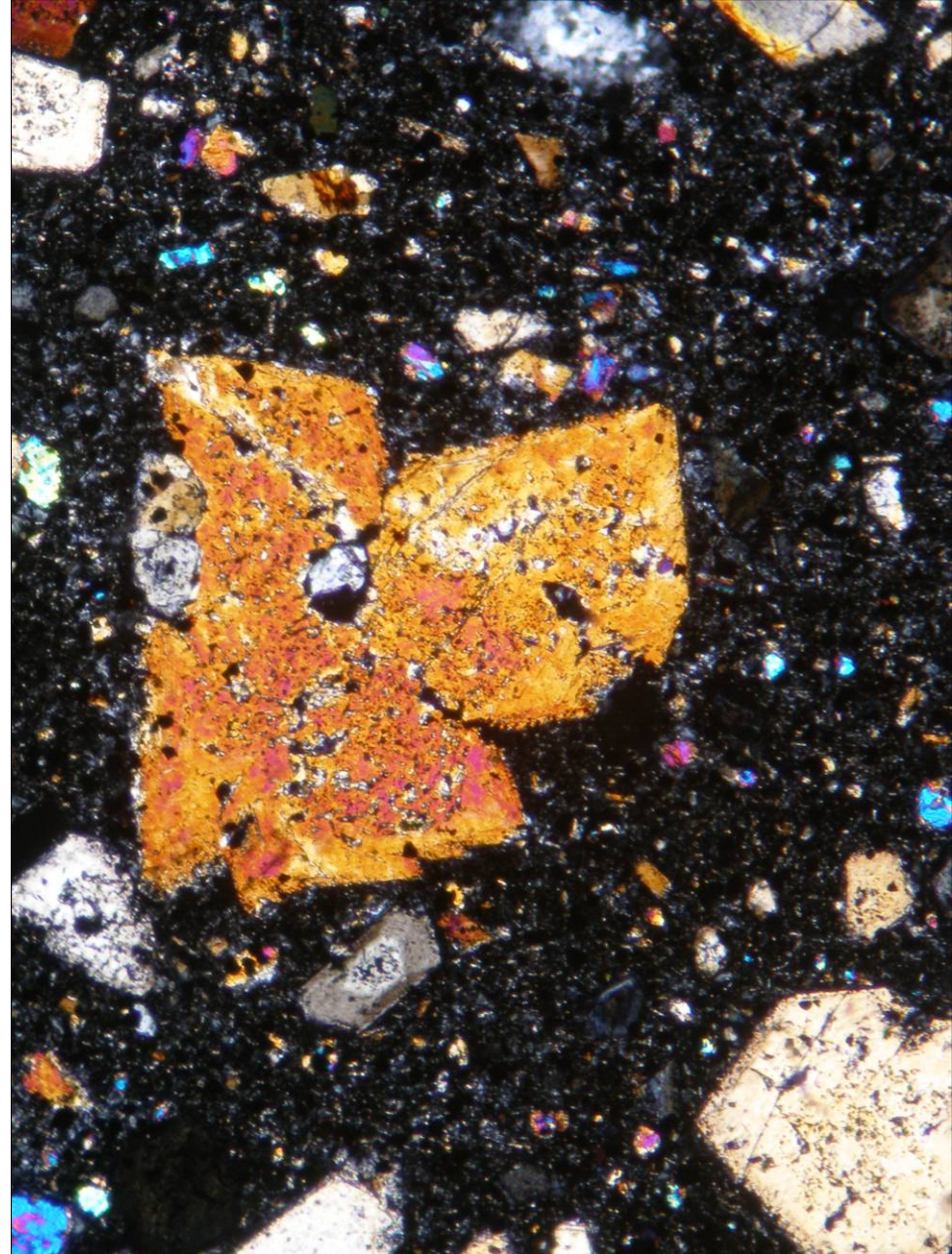
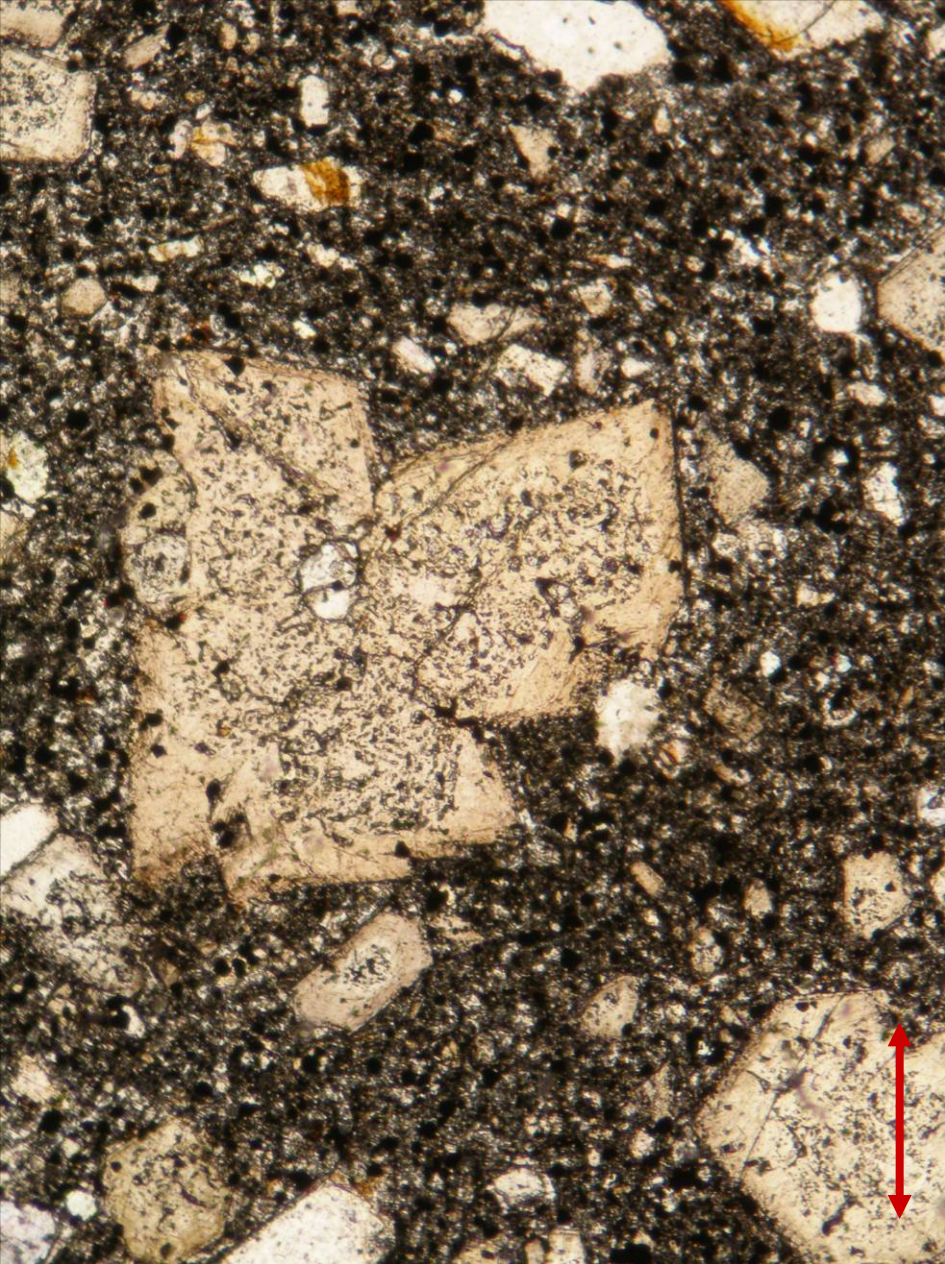
A cluster of augite phenocrysts in basalt, Byšta, Slovakia; PPL (left) and XPL (right). Width of fields of view is ca. 2 mm. Photo: JiZi.





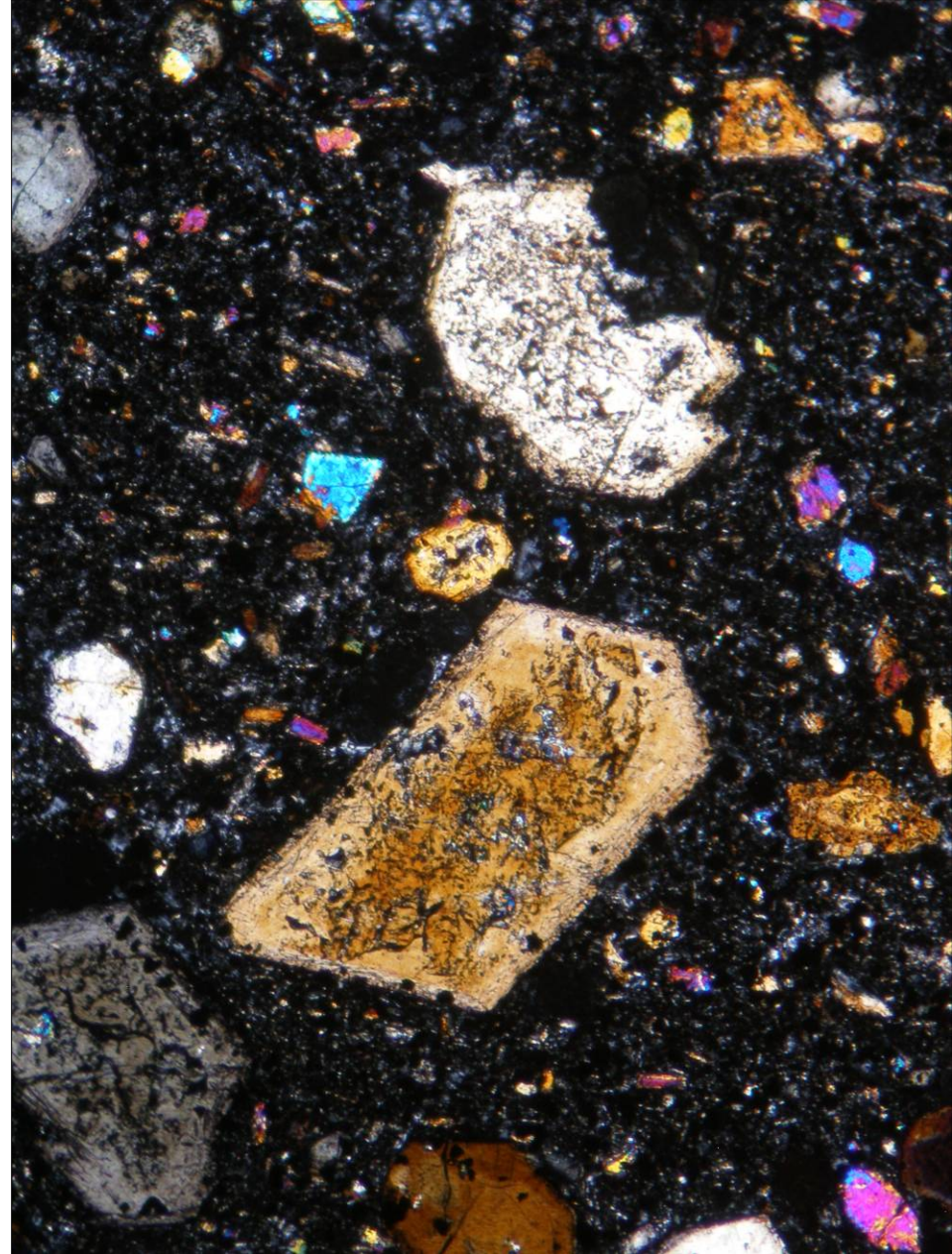
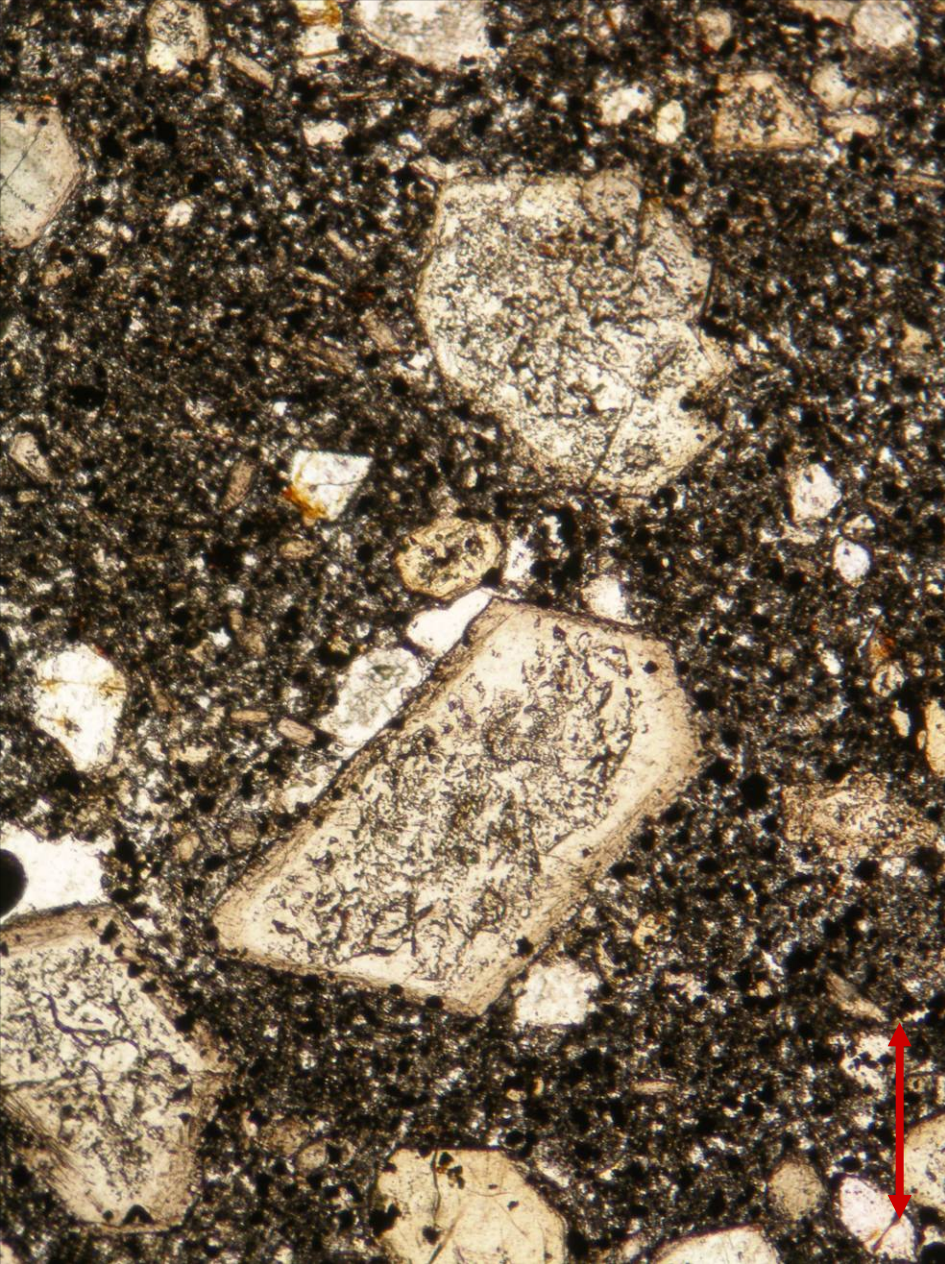
Clinopyroxene (augite) phenocrysts in basanite to nephelinite from Mezina, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 2 mm. Photo: JiZi.





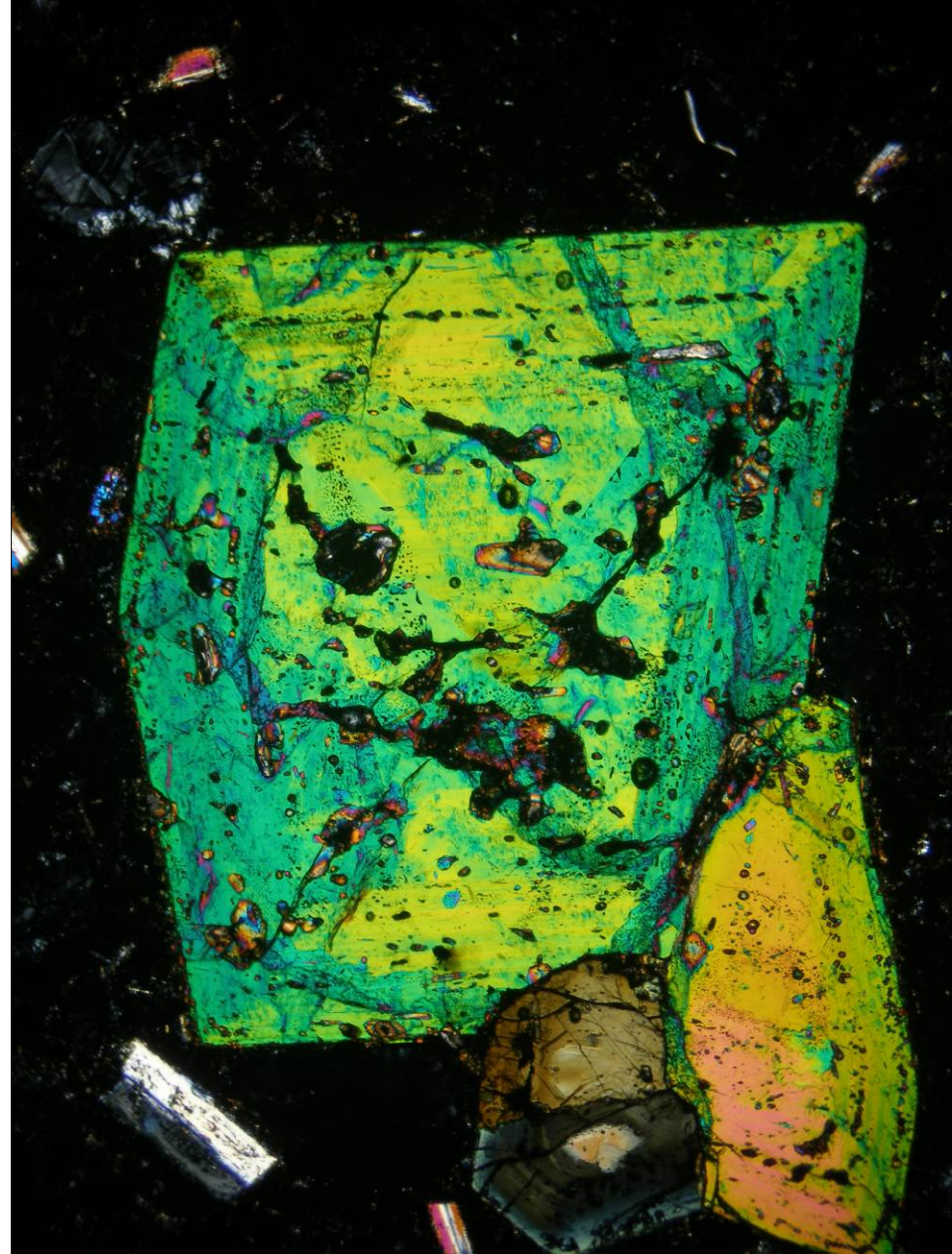
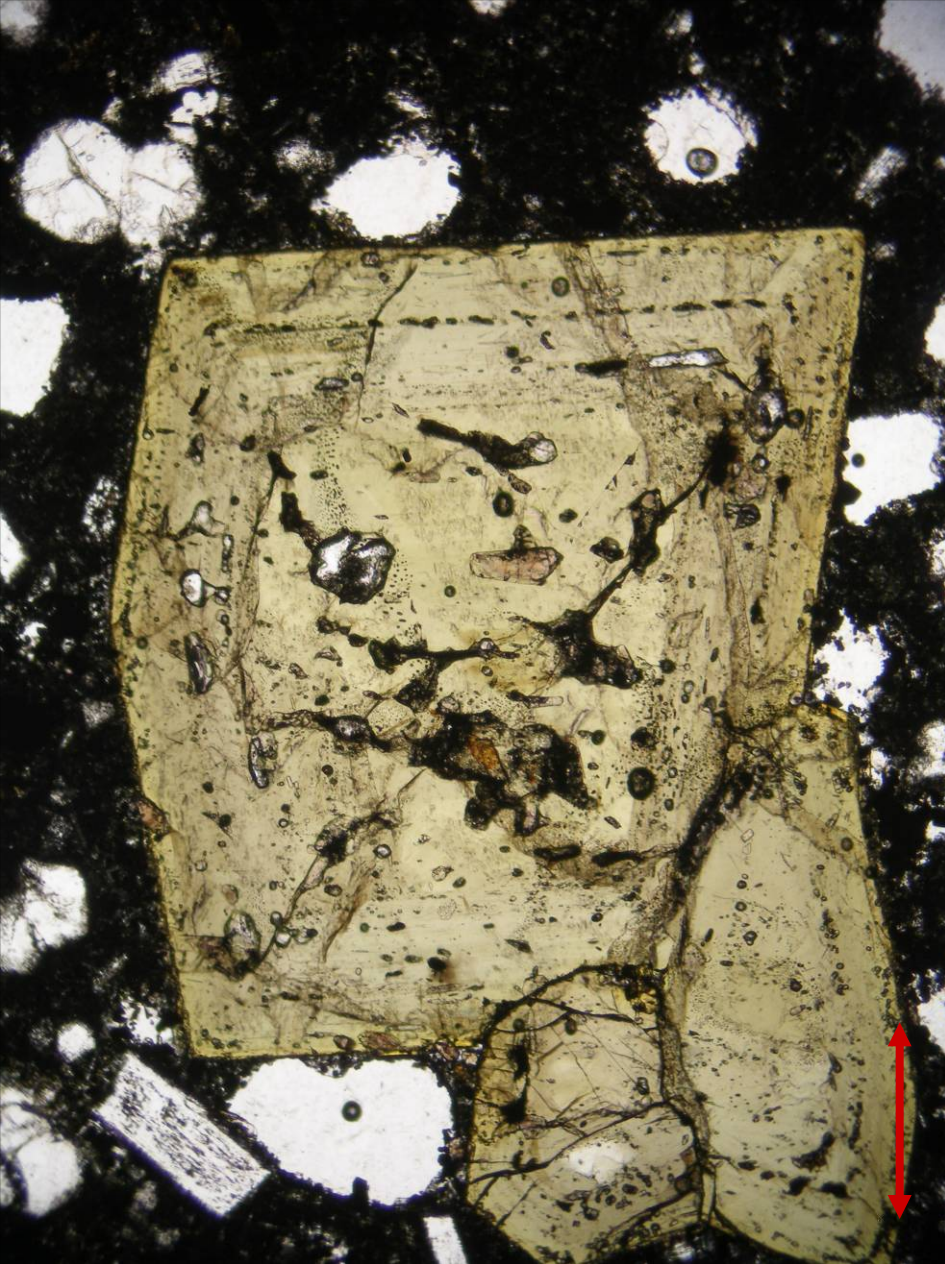
A cluster of clinopyroxene (augite) phenocrysts in basanite to nephelinite from Mezina, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 2 mm. Photo: JiZi.





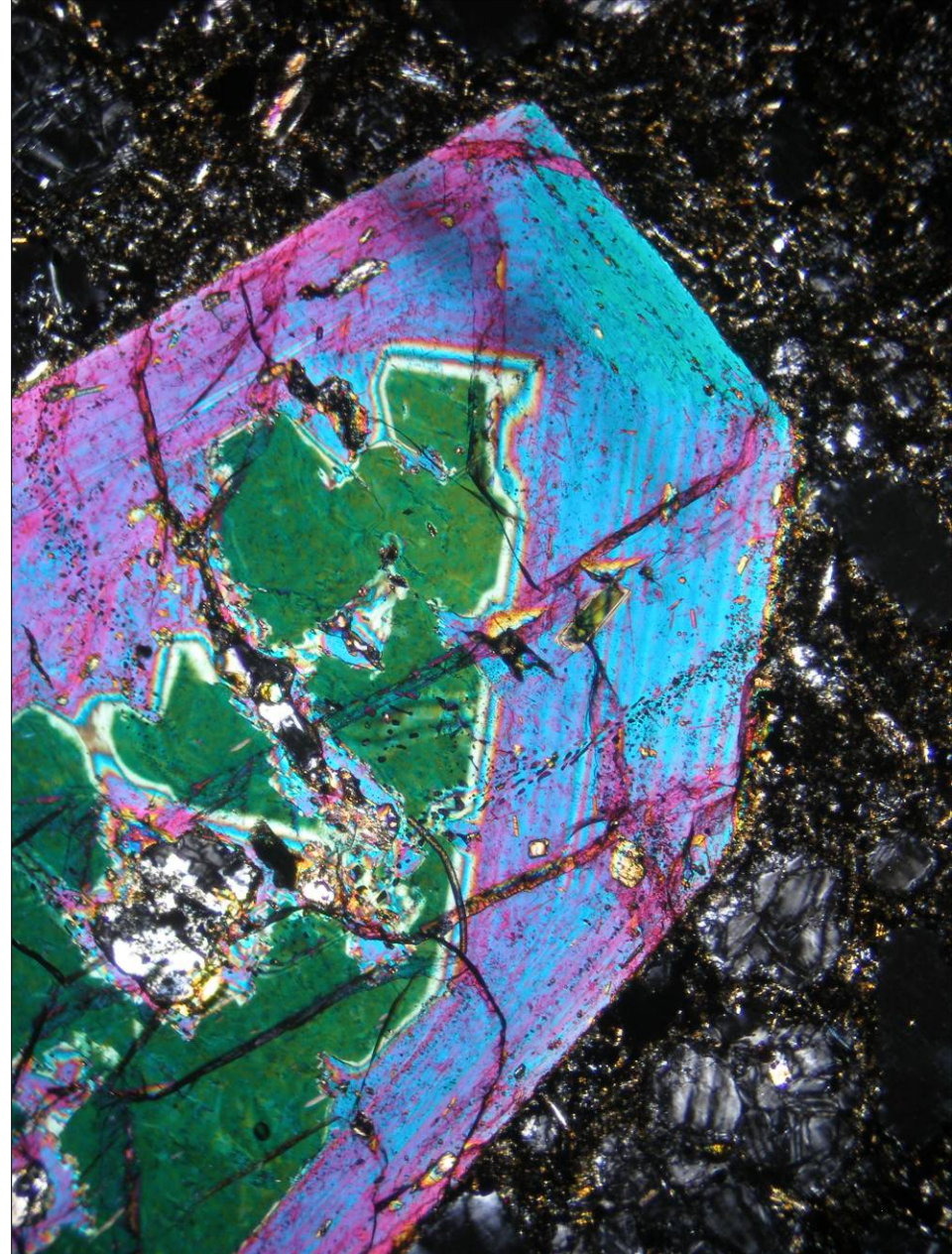
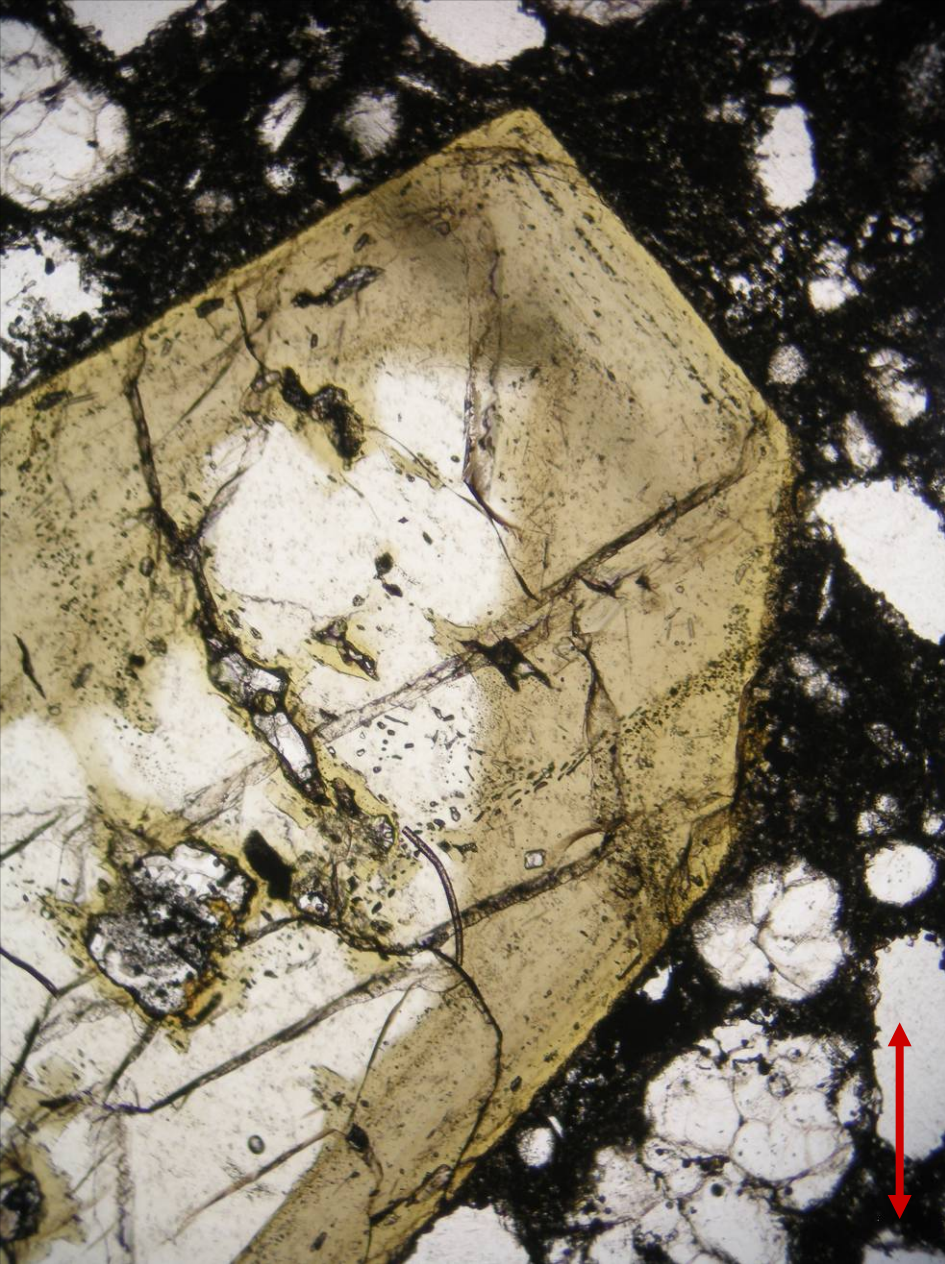
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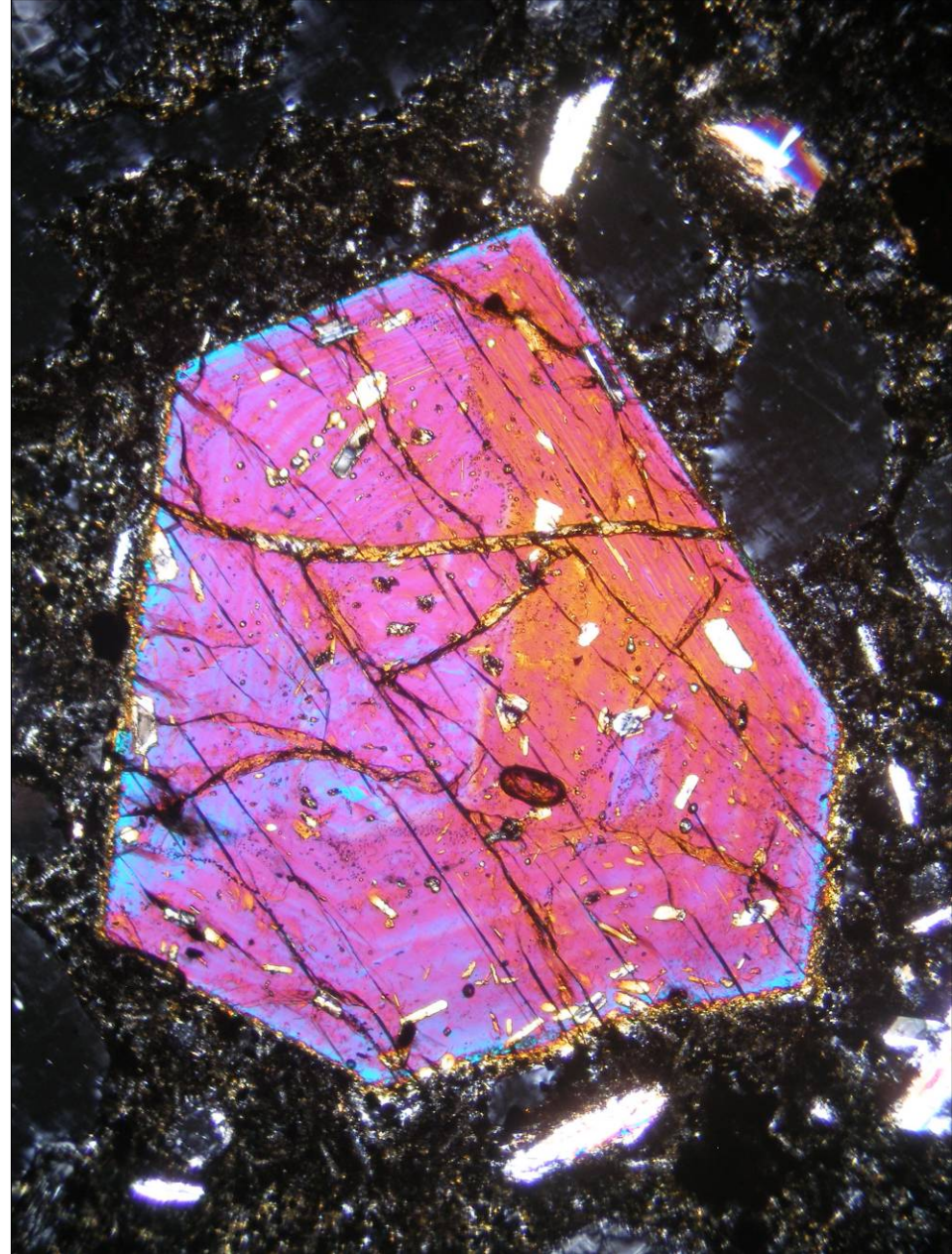
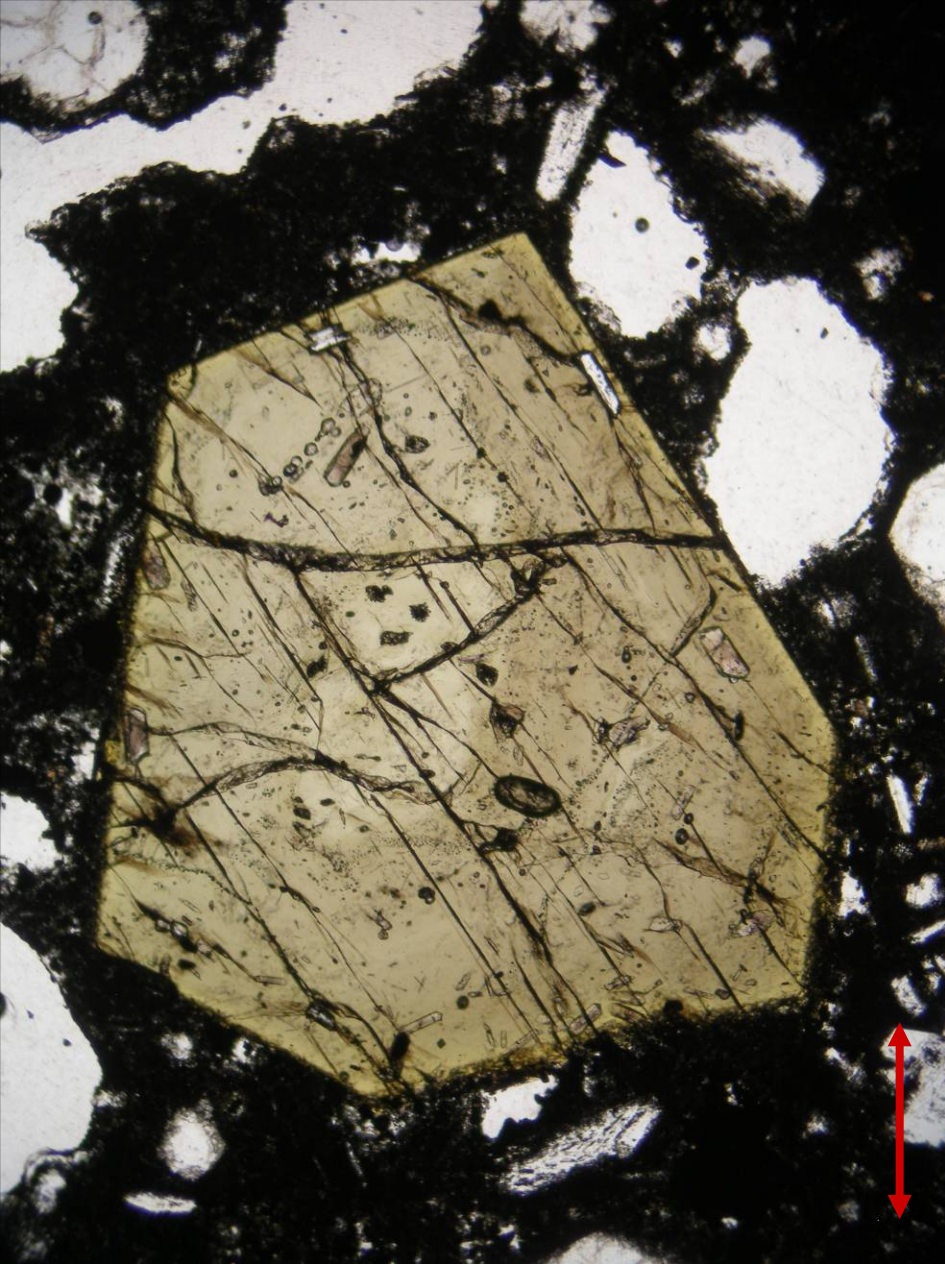
Augite in tephrite from Vesuvius Volcano, Italy; PPL (left) and XPL (right). Width of fields of view is ca. 1.8 mm. Photo: JiZi.





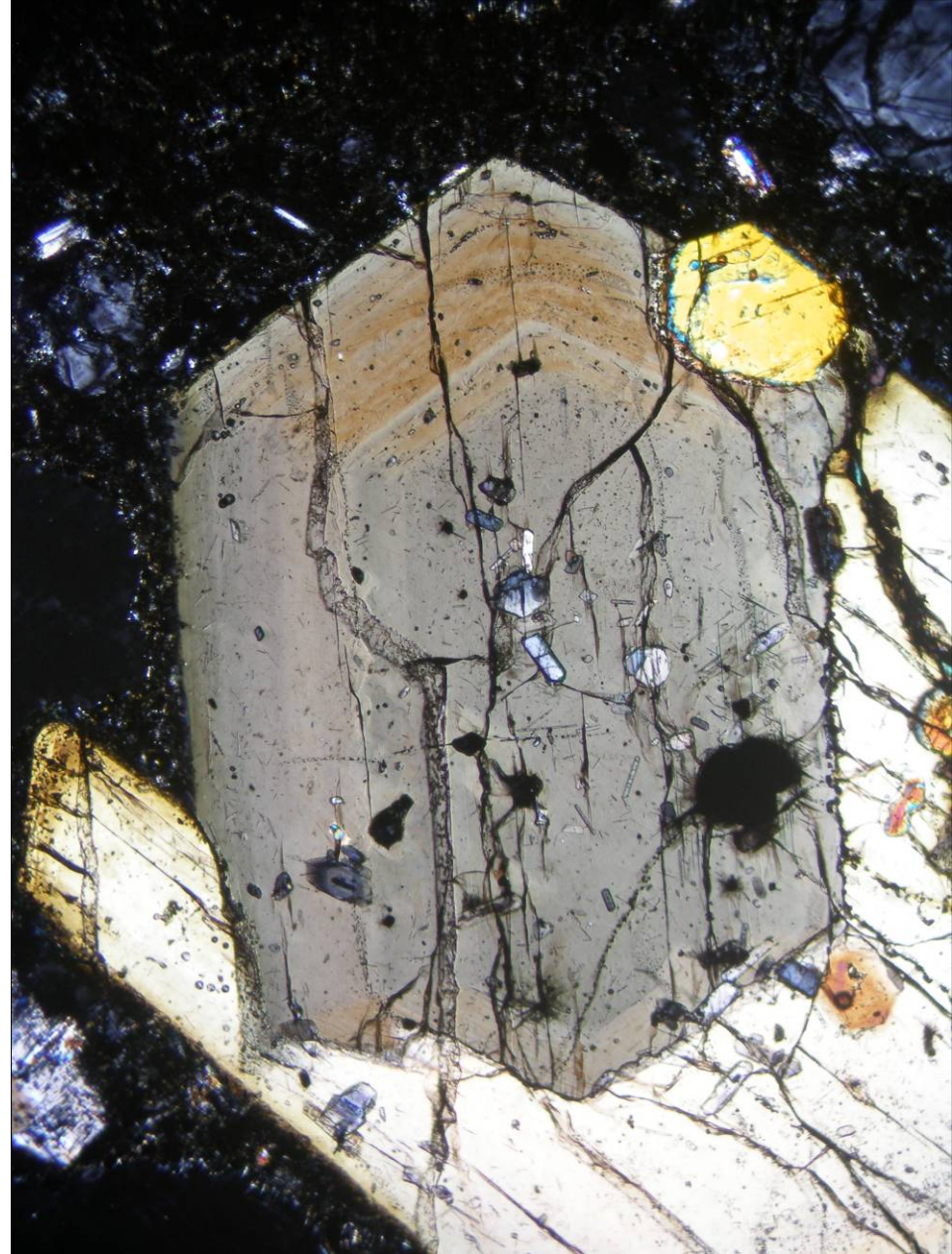
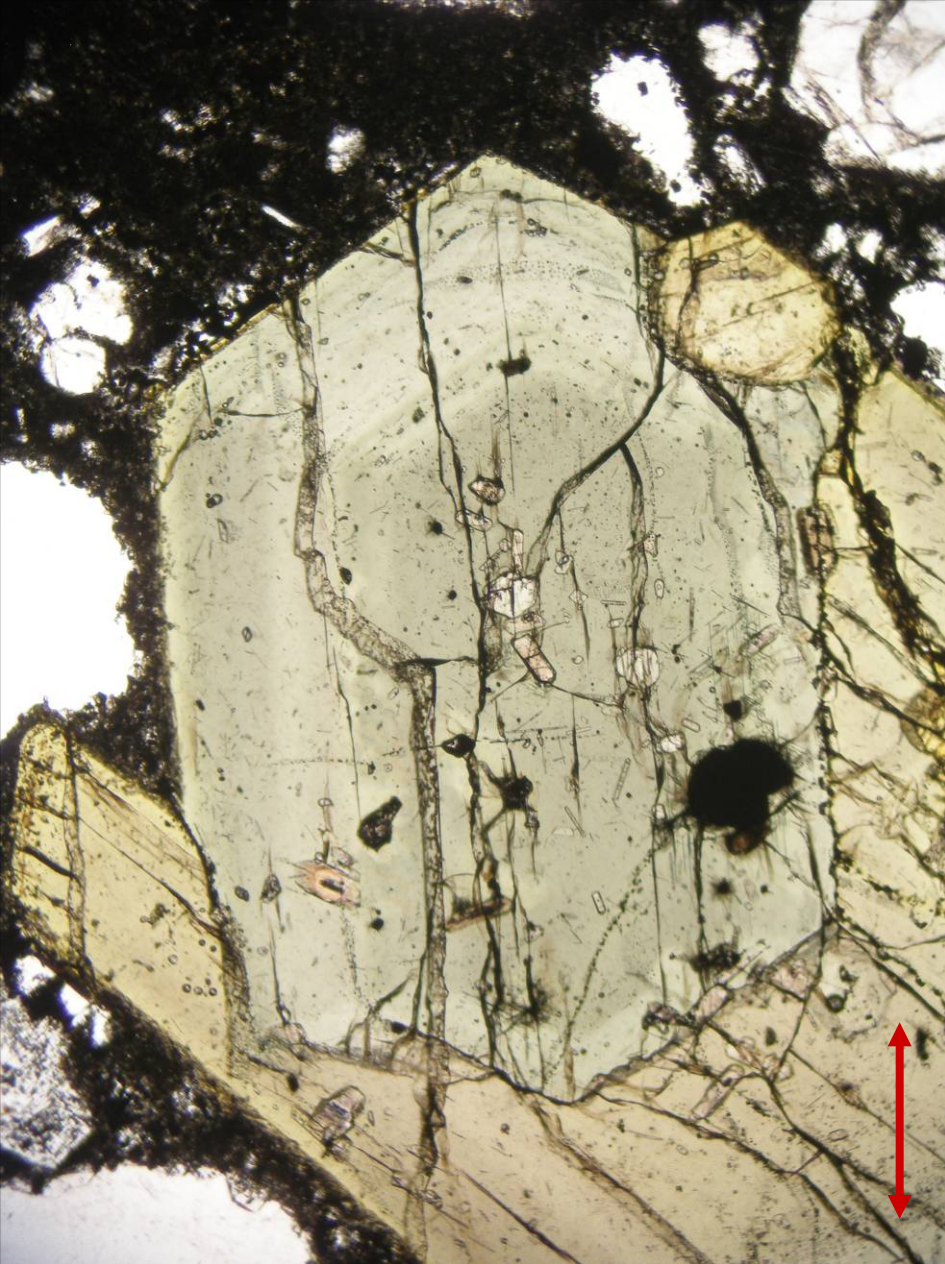
Augite in tephrite from Vesuvius Volcano, Italy; PPL (left) and XPL (right). Width of fields of view is ca. 2.2 mm. Photo: JiZi.





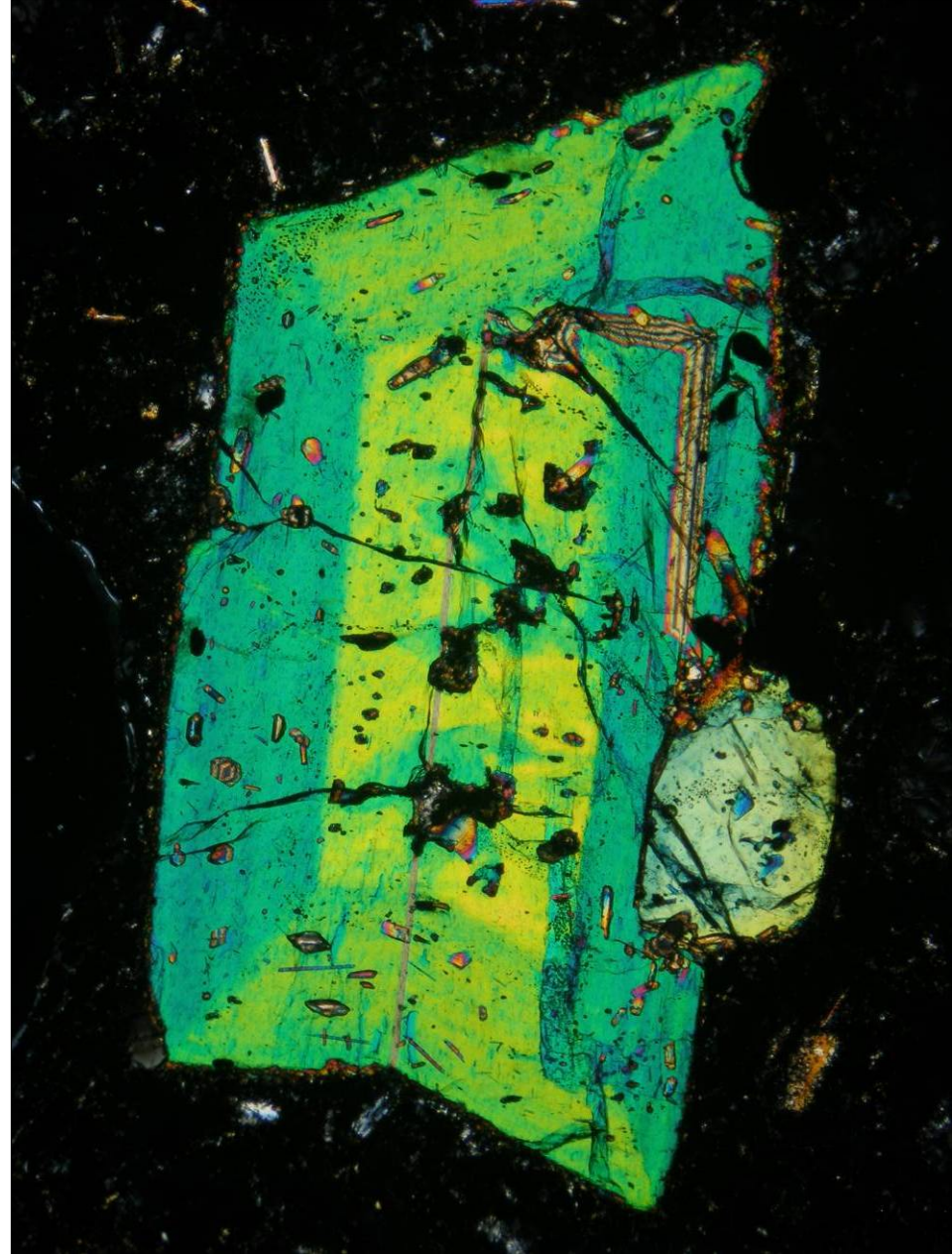
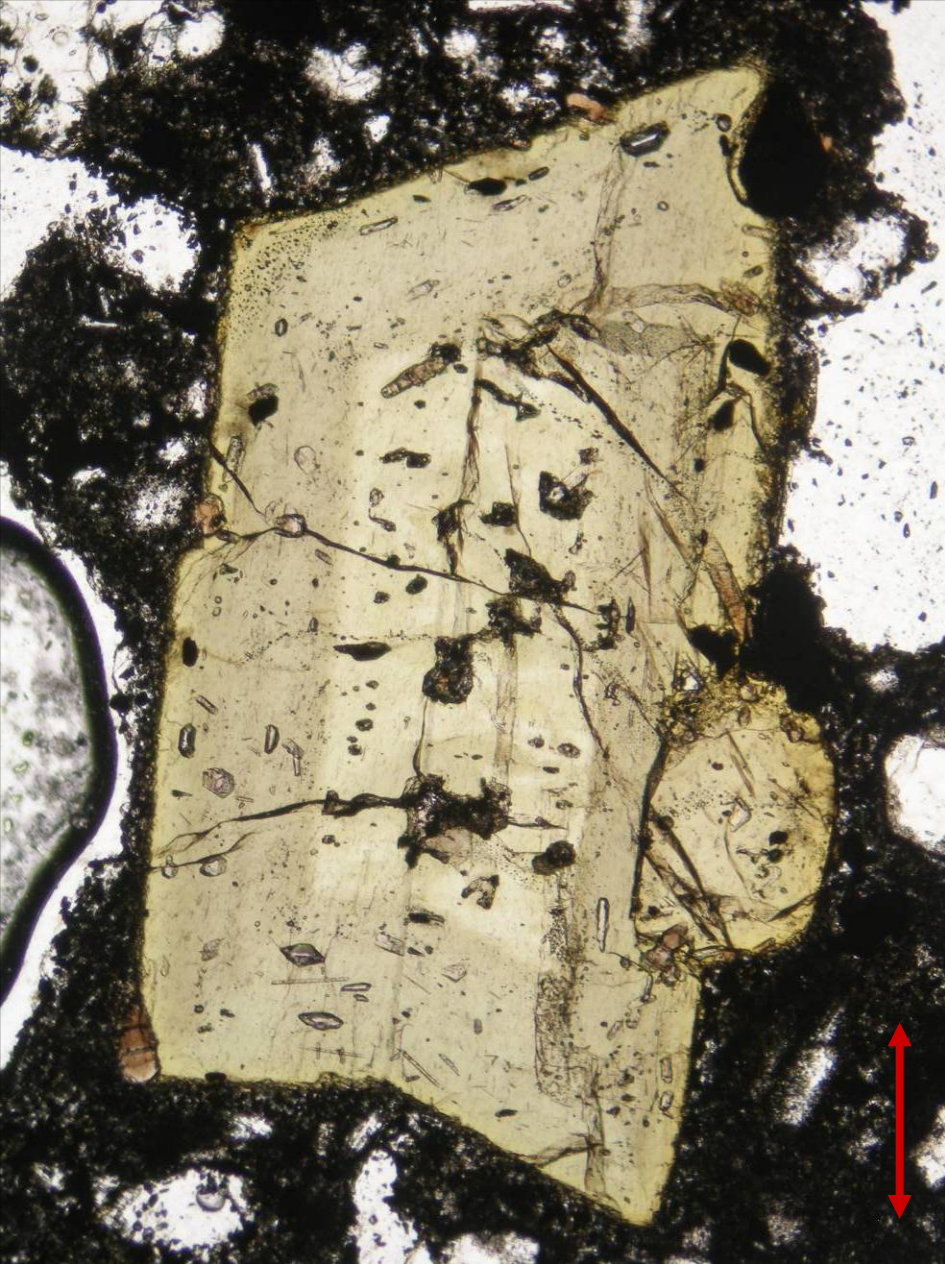
Augite in tephrite from Vesuvius Volcano, Italy; PPL (left) and XPL (right). Width of fields of view is ca. 2.0 mm. Photo: JiZi.





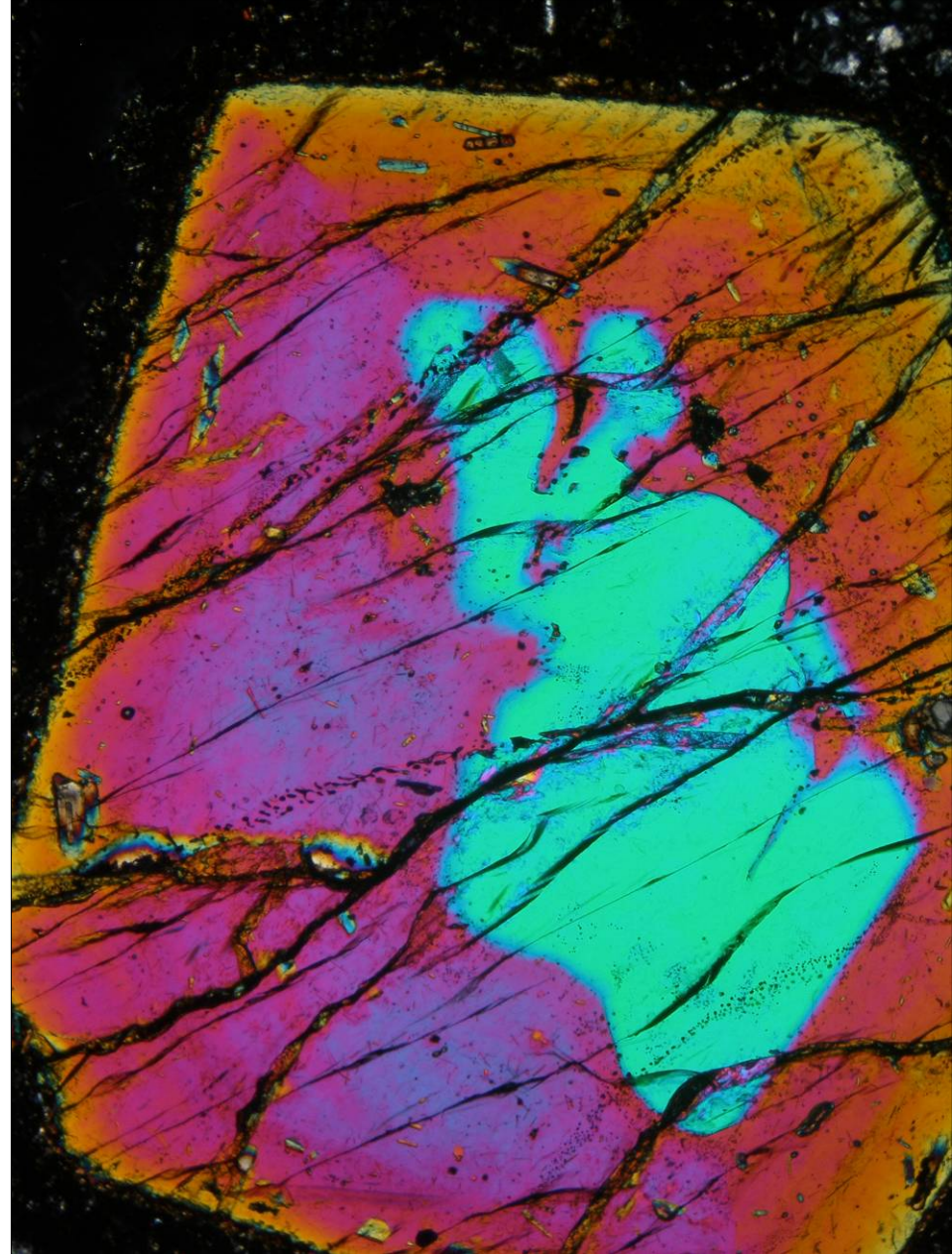
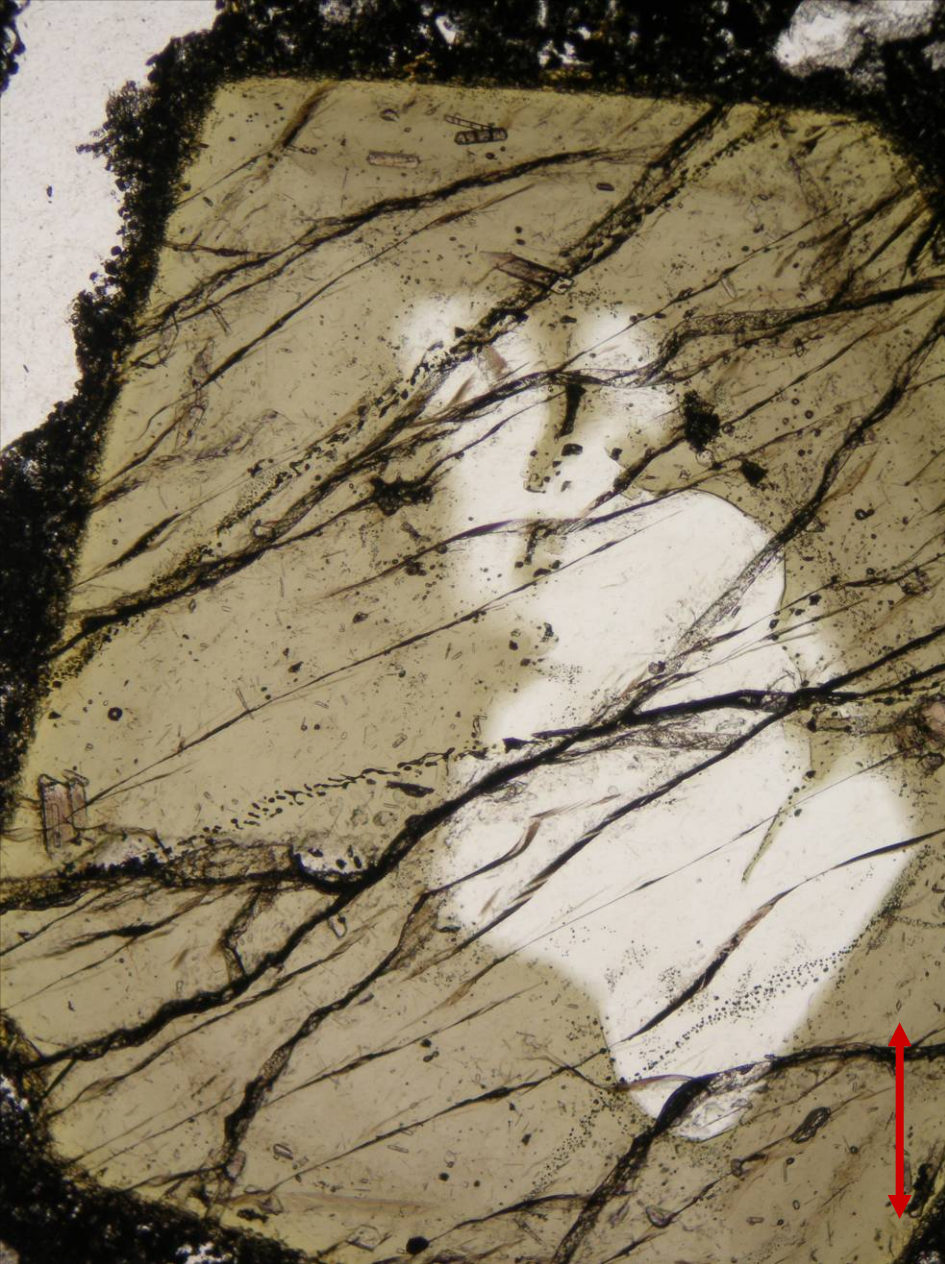
Augite in tephrite from Vesuvius Volcano, Italy; PPL (left) and XPL (right). Width of fields of view is ca. 2.0 mm. Photo: JiZi.





Augite in tephrite from Vesuvius Volcano, Italy; PPL (left) and XPL (right). Width of fields of view is ca. 2.0 mm. Photo: JiZi.





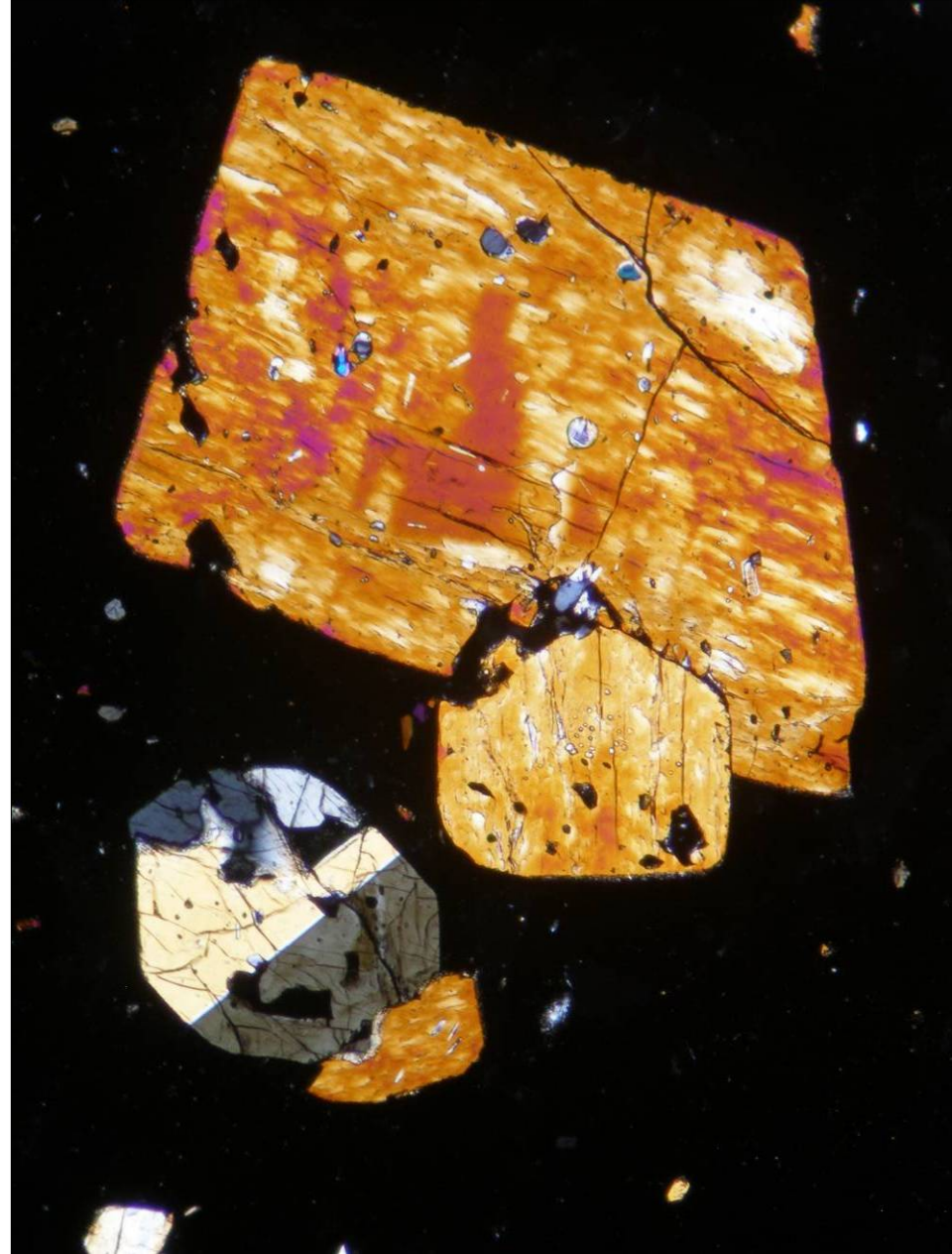
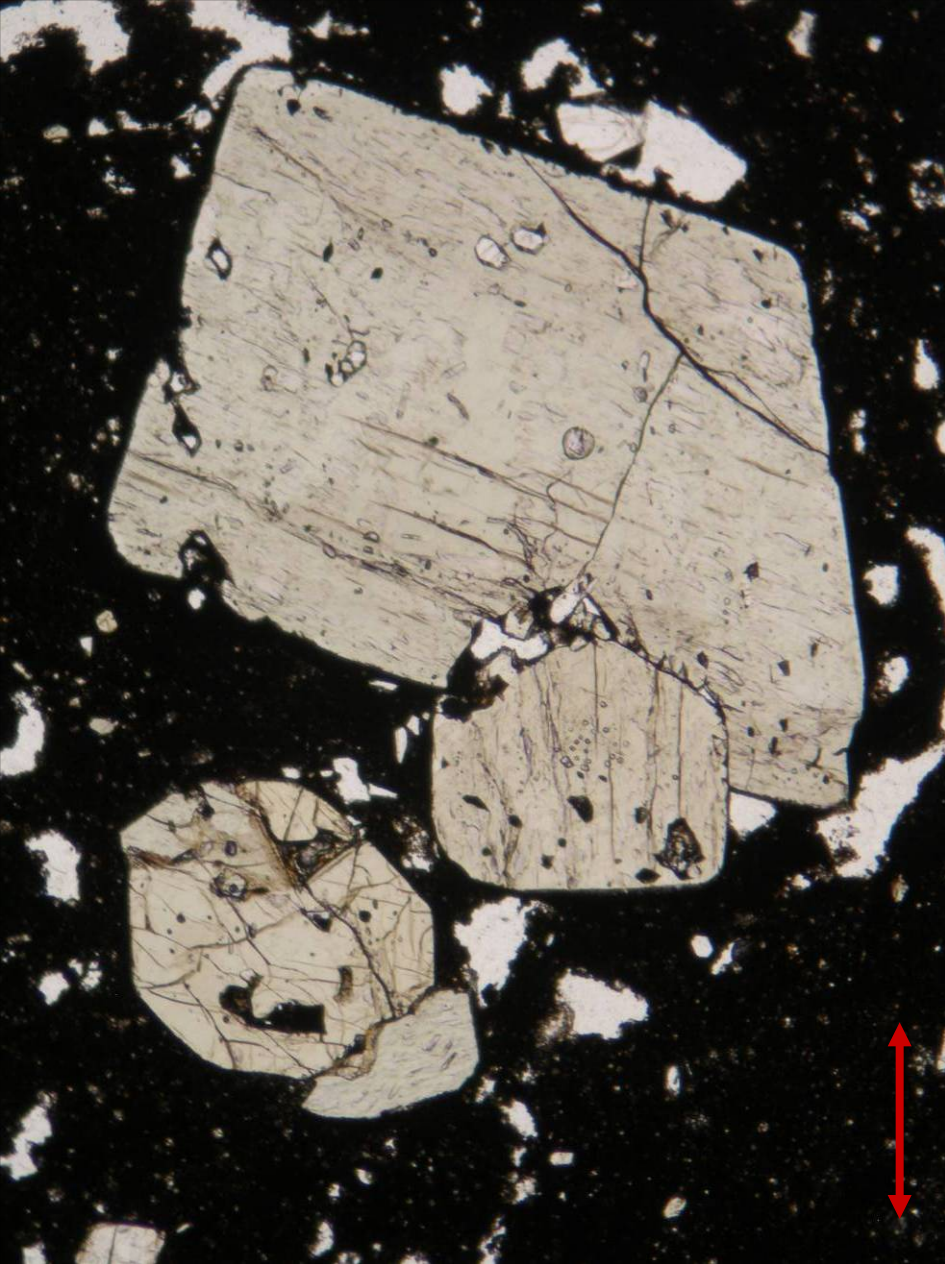
Augite in tephrite from Vesuvius Volcano, Italy; PPL (left) and XPL (right). Width of fields of view is ca. 2.0 mm. Photo: JiZi.





Augite and leucite in tephrite from Vesuvius Volcano, Italy; PPL (left) and XPL (right). Width of fields of view is ca. 1.7 mm. Photo: JiZi.





Augite in tephrite from Vesuvius Volcano, Italy; PPL (left) and XPL (right). Width of fields of view is ca. 1.7 mm. Photo: JiZi.





Augite in tephrite from Vesuvius Volcano, Italy; PPL (left) and XPL (right). Width of fields of view is ca. 1.7 mm. Photo: JiZi.