

TOURMALINE – SCHORL

Chemical formula: $\text{NaFe}^{2+}_3\text{Al}_6[(\text{OH},\text{F},\text{O})_4](\text{BO}_3)_3[\text{Si}_6\text{O}_{18}]$

Crystal system: trigonal

Color in thin section: consistently strongly pleochroic:

X = yellow-green, pale yellow, colorless,

Z = brown, yellow-brown, light blue, brown-black

(longitudinal sections are darkest when their long dimension is perpendicular to the vibration direction of the lower polar)

Form: columnar to acicular crystals with rounded triangular or crudely hexagonal cross section; allotriomorphic grains or irregular masses

Cleavage: none, often fractures perpendicular to the length of crystals

Indices of refraction: $n_\omega = 1.650 - 1.670$ $n_\epsilon = 1.625 - 1.645$

Birefringence: 0.015 – 0.035

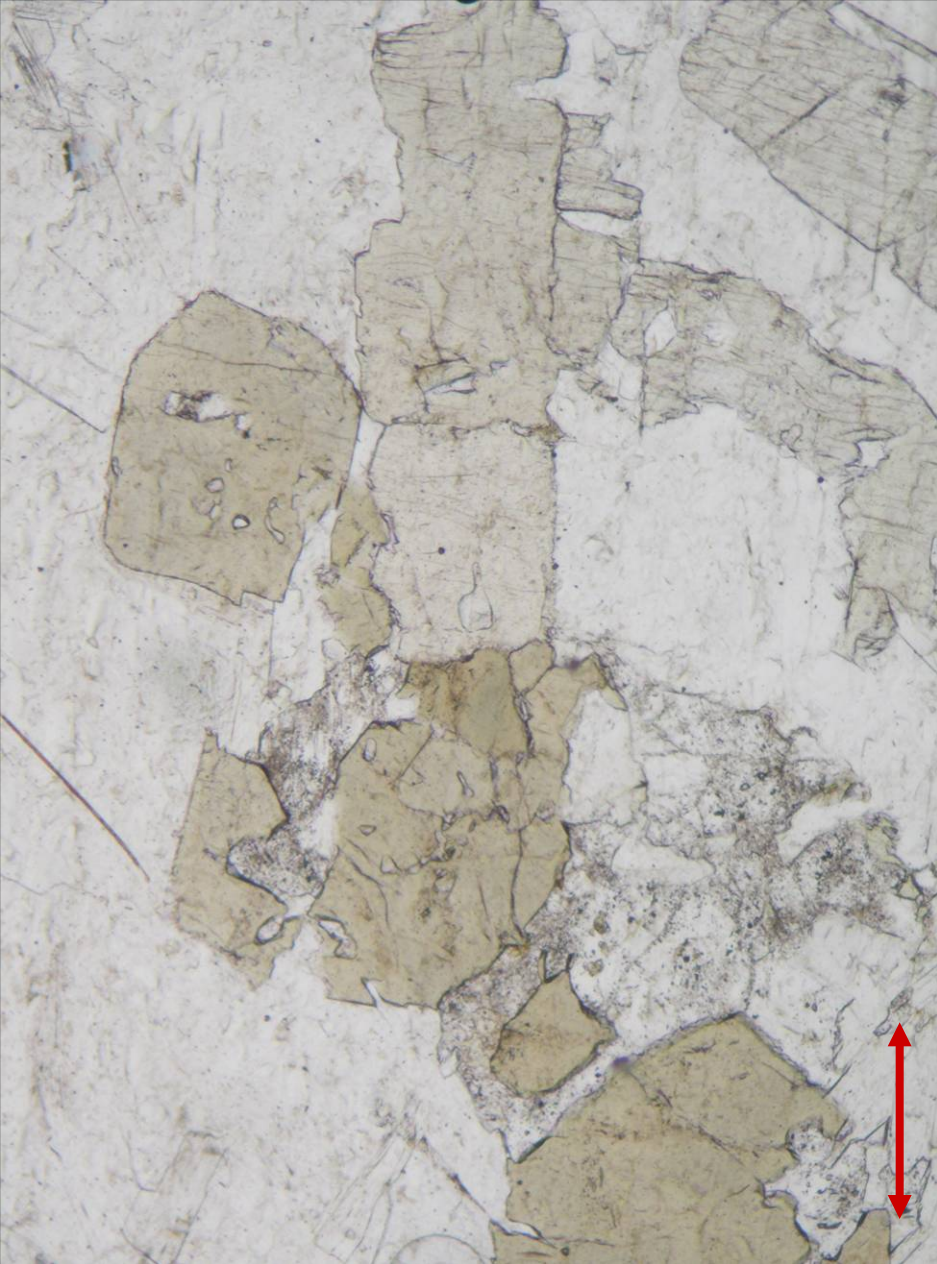
Optic sign: uniaxial negative

Sign of elongation: negative

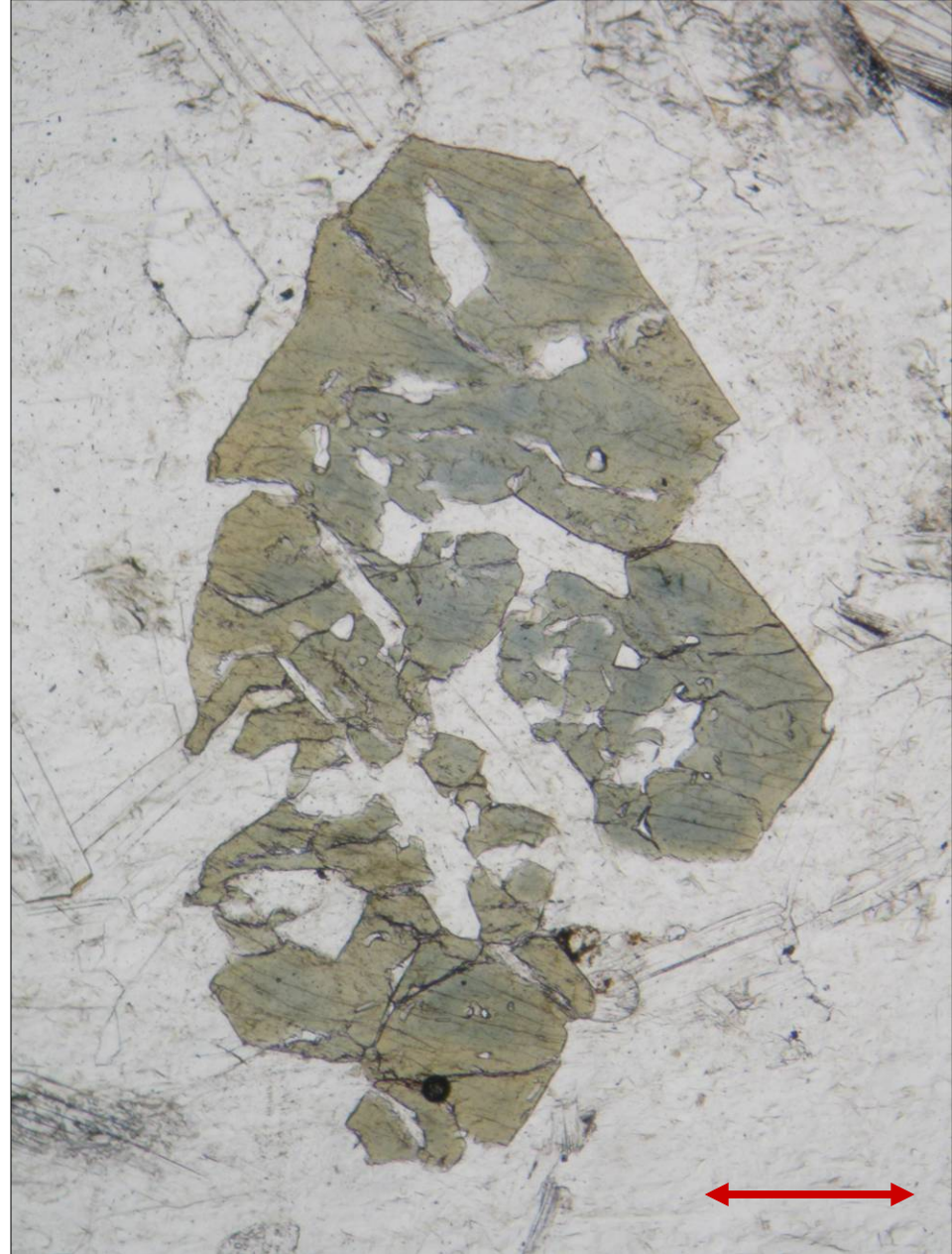
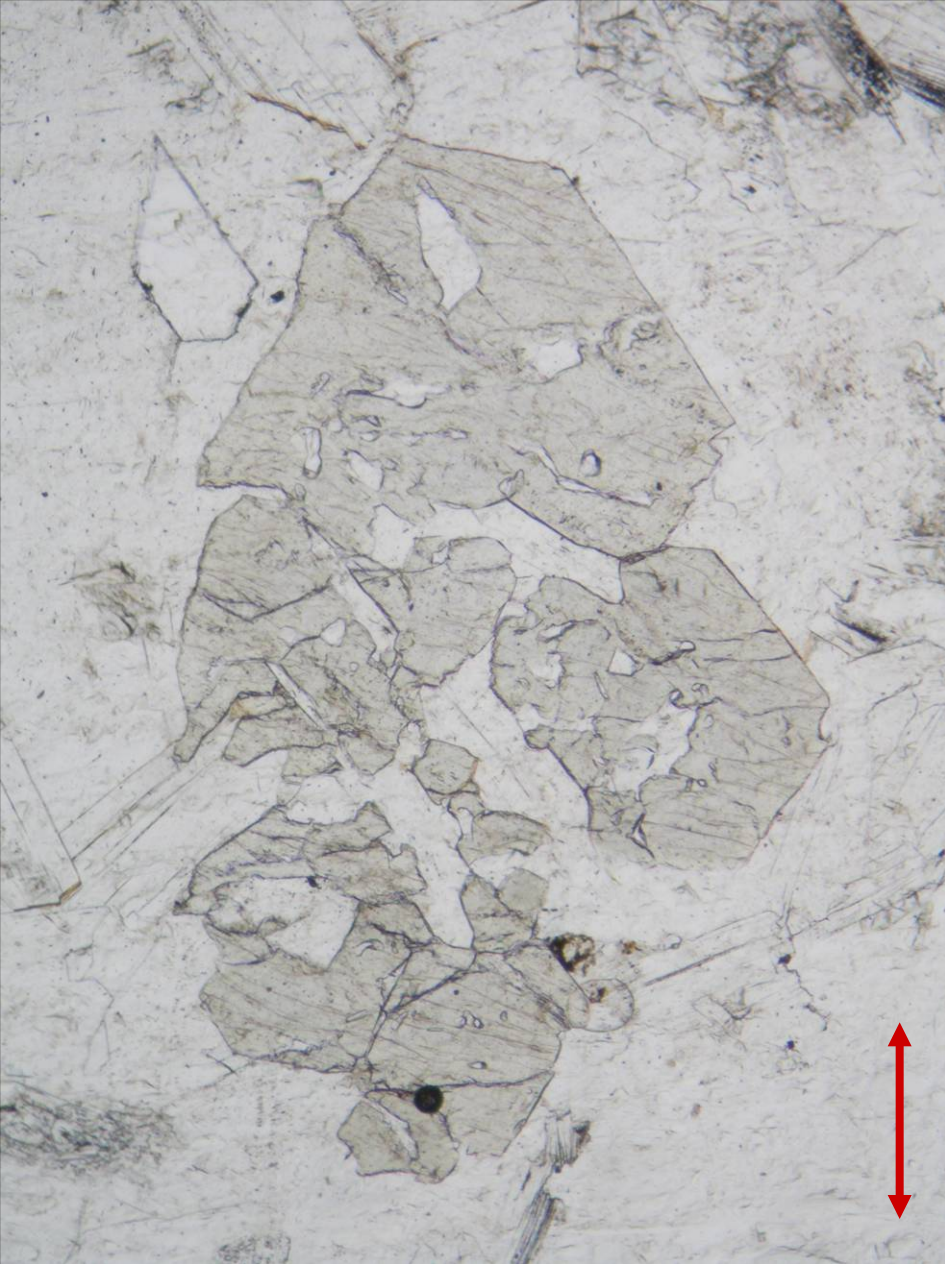
Alteration: may alter to various phyllosilicates (muscovite, chlorite...)

Occurrence: granitic pegmatites, granite, granodiorite, mica schist, gneiss, phyllite

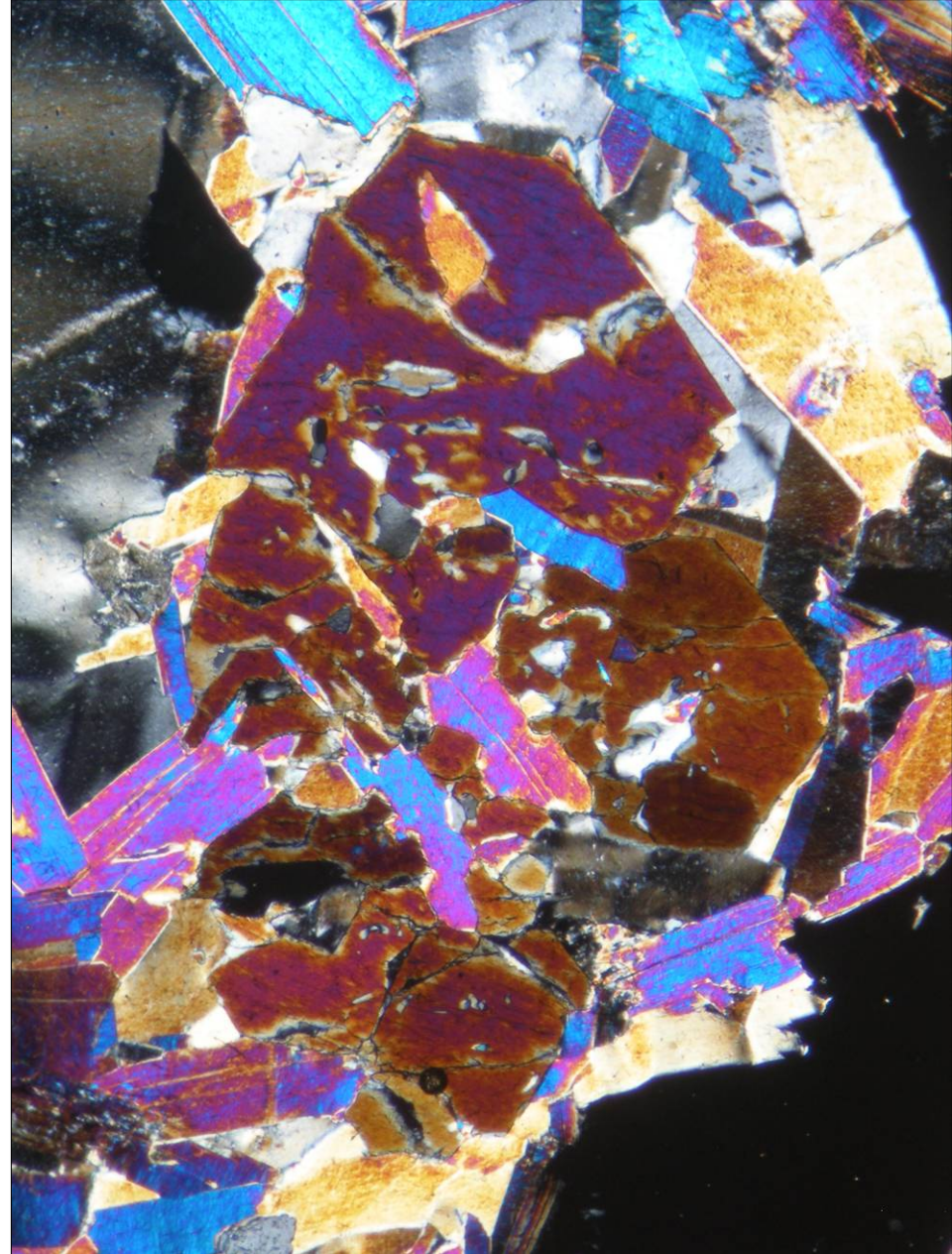
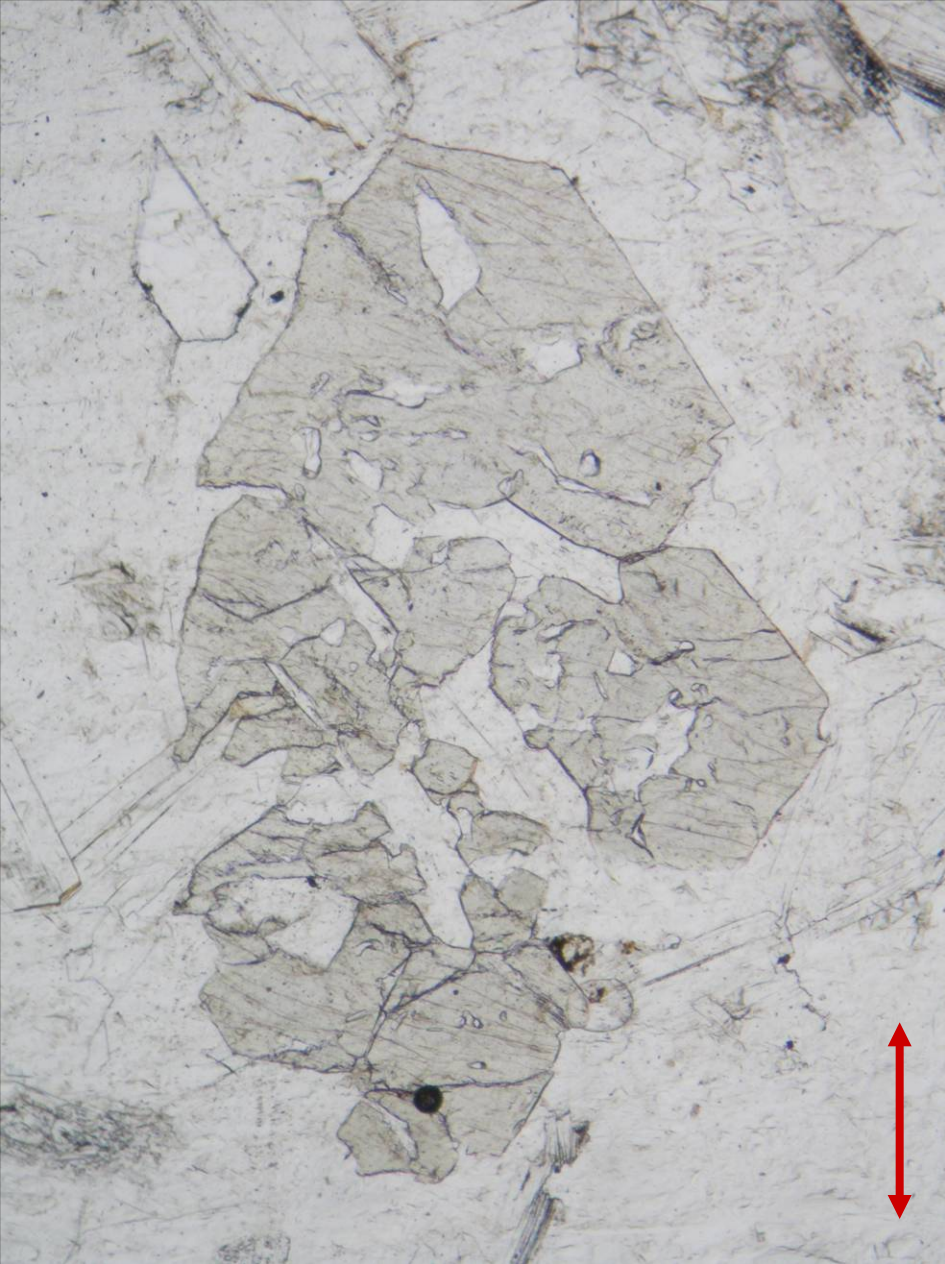
Similar minerals in thin sections: biotite (perfect cleavage and different absorption – biotite laths are darkest when their long dimension is aligned with the vibration direction of the lower polar), staurolite (different absorption)



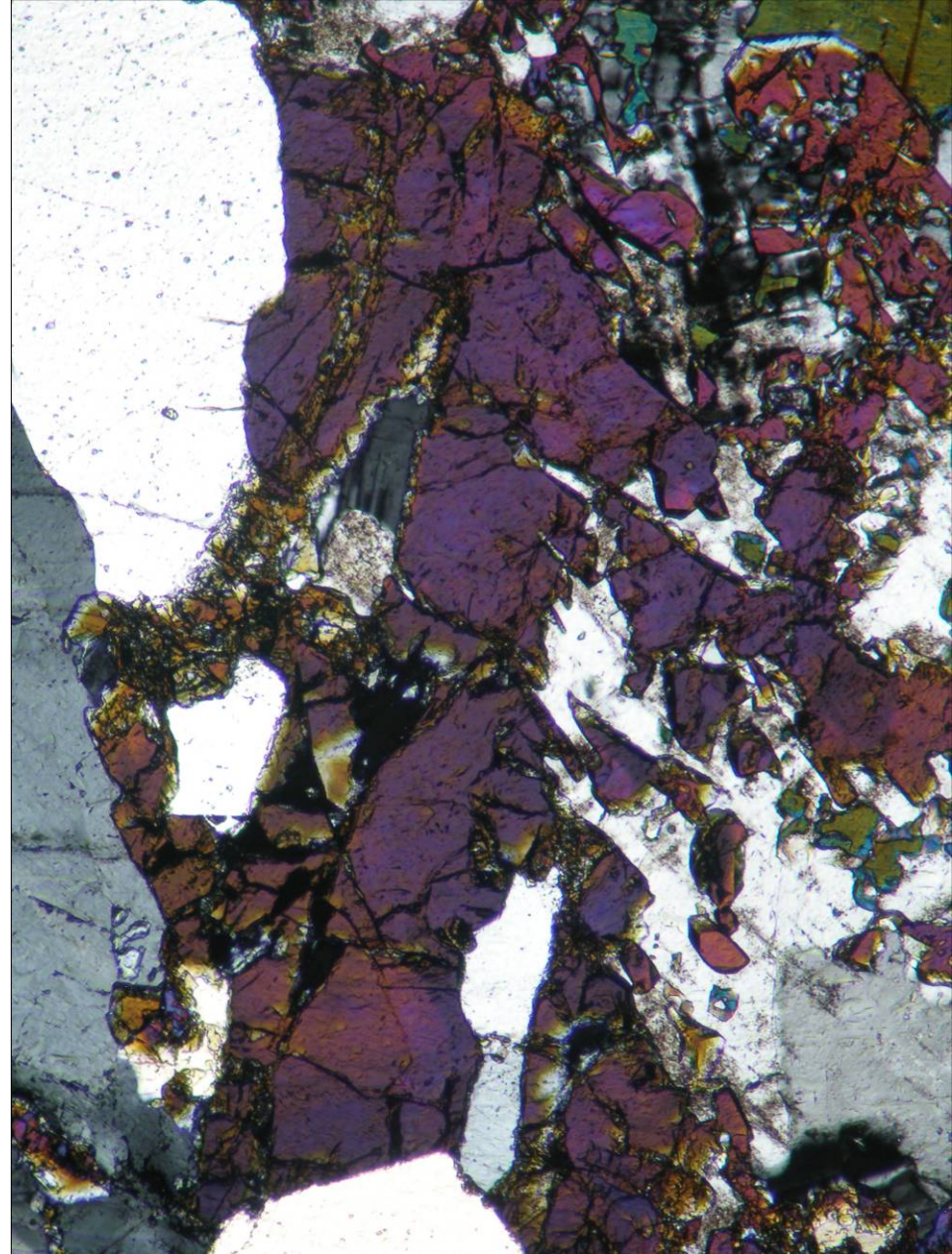
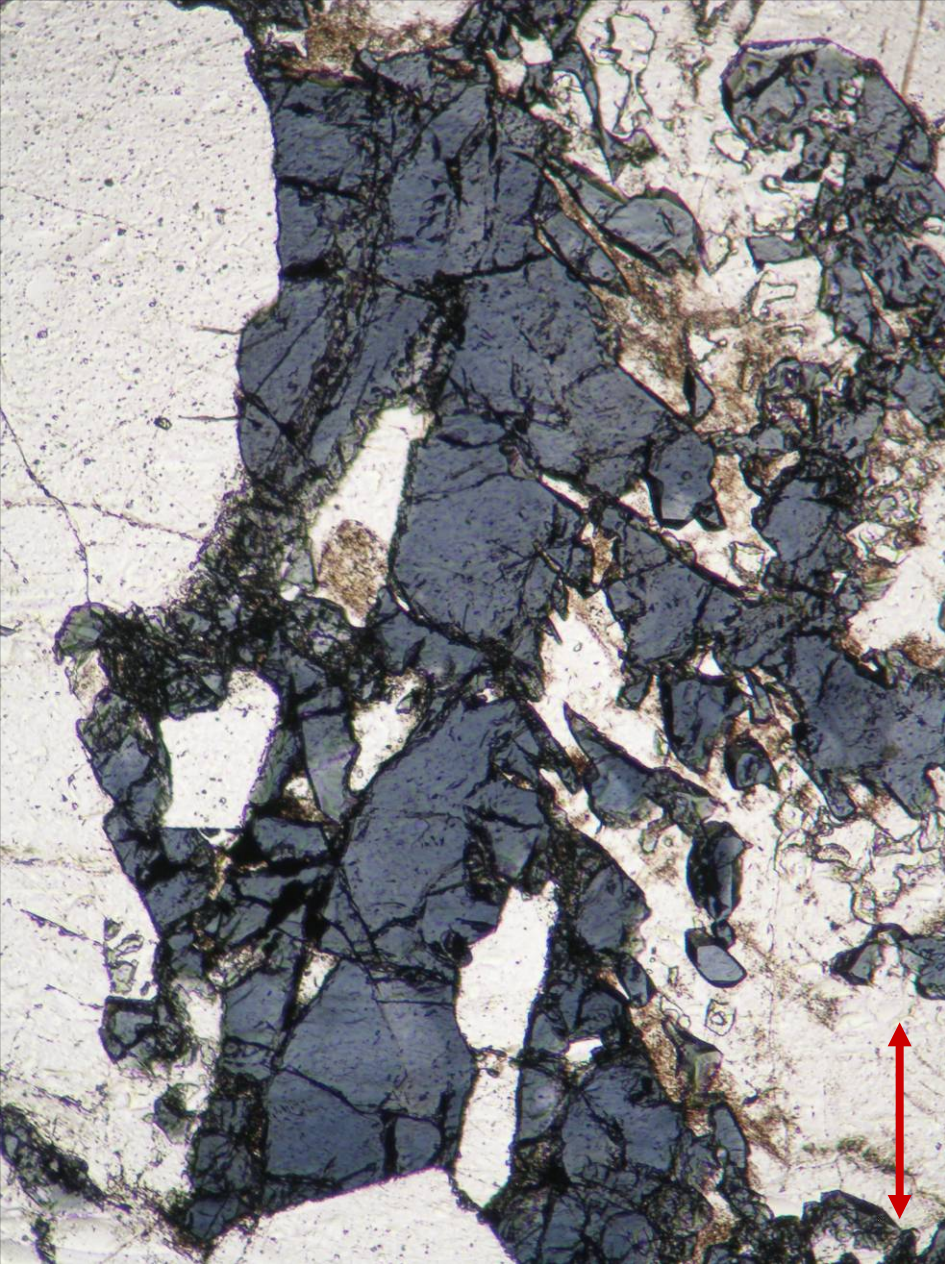
Pleochroism of schorl in migmatite from Kaňk near Kutná Hora, the Czech Republic; PPL. Width of fields of view is ca. 1.8 mm. Photo: JiZi.



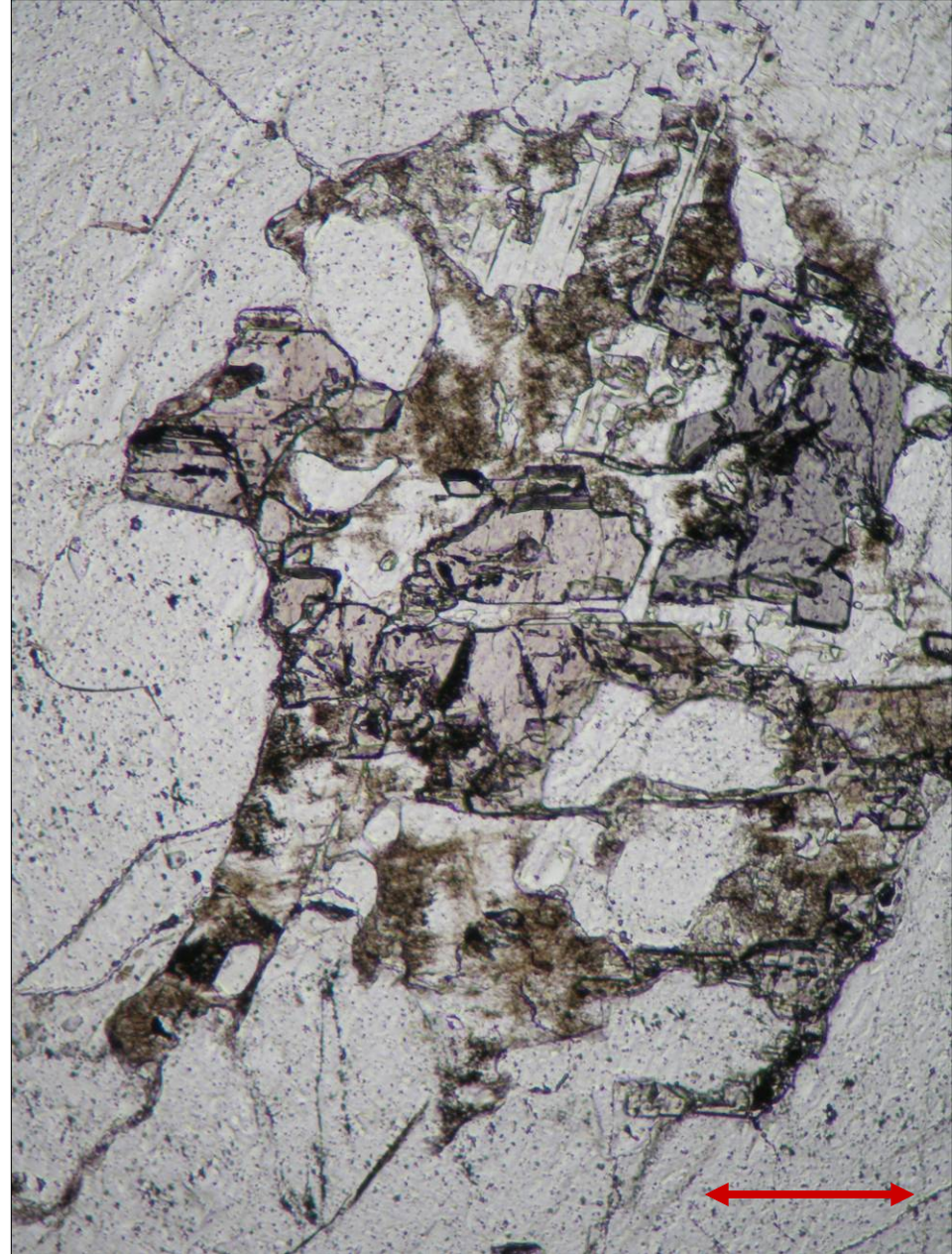
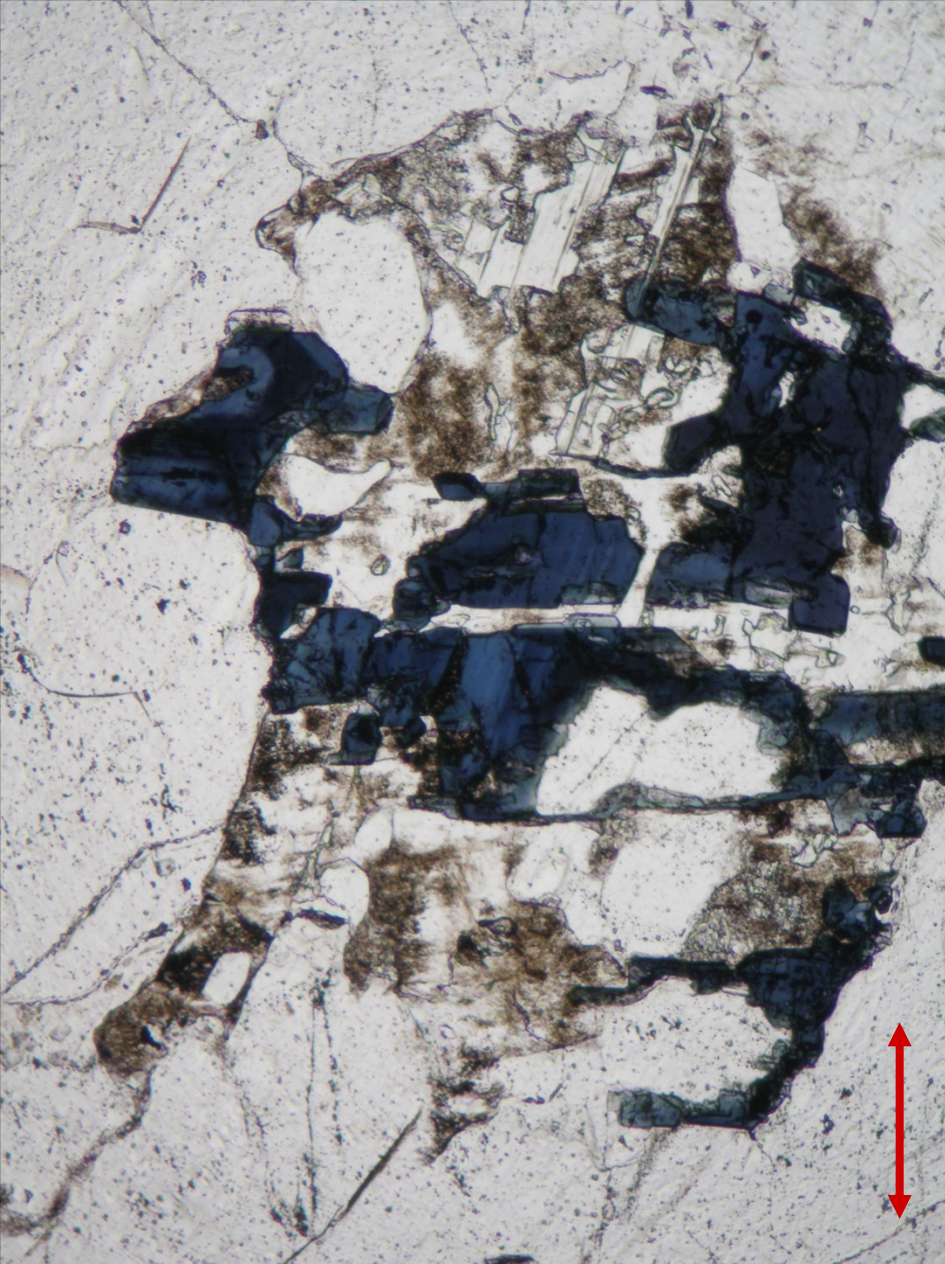
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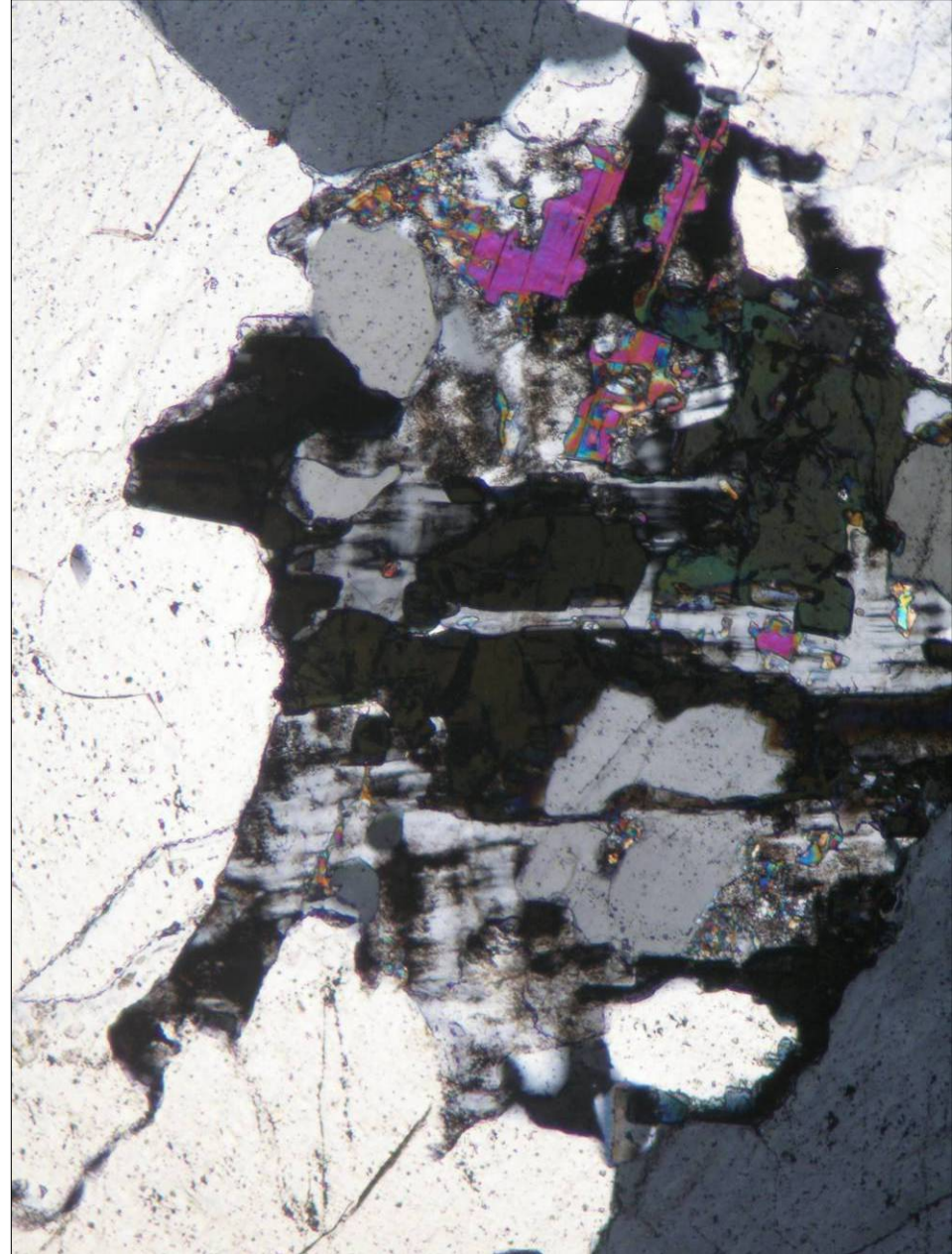
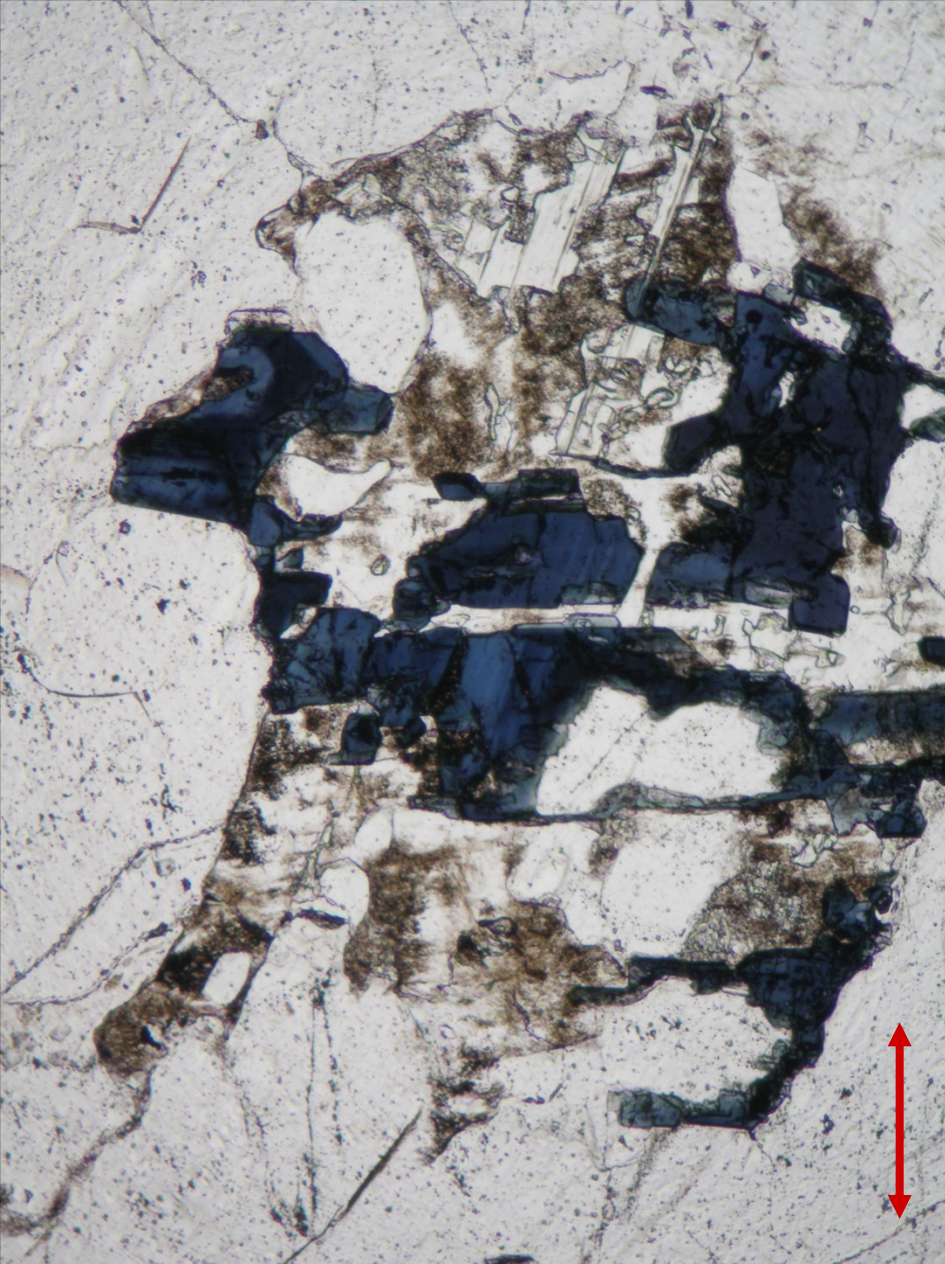
Schorl in migmatite from Kaňk near Kutná Hora, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.8 mm. Photo: JiZi.



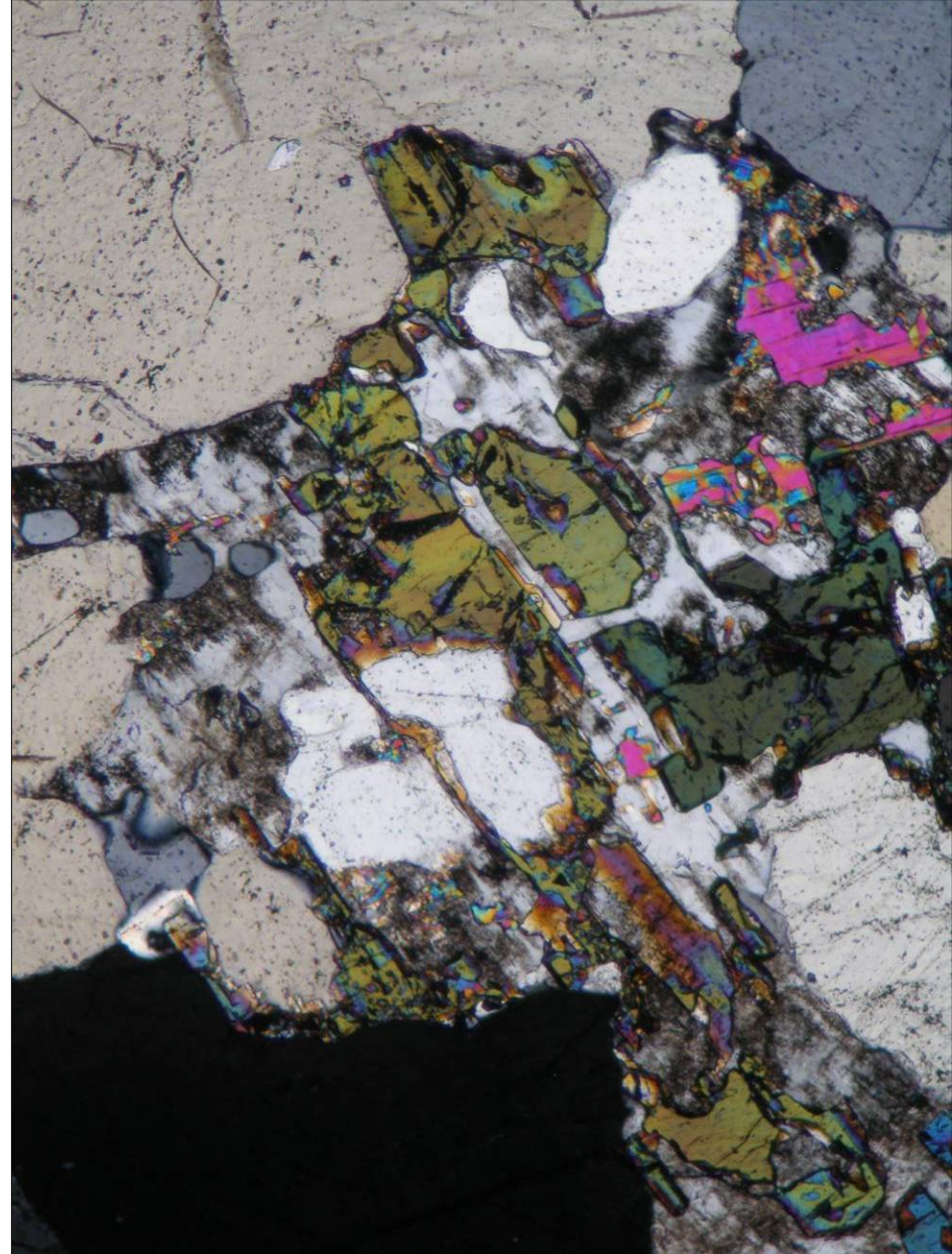
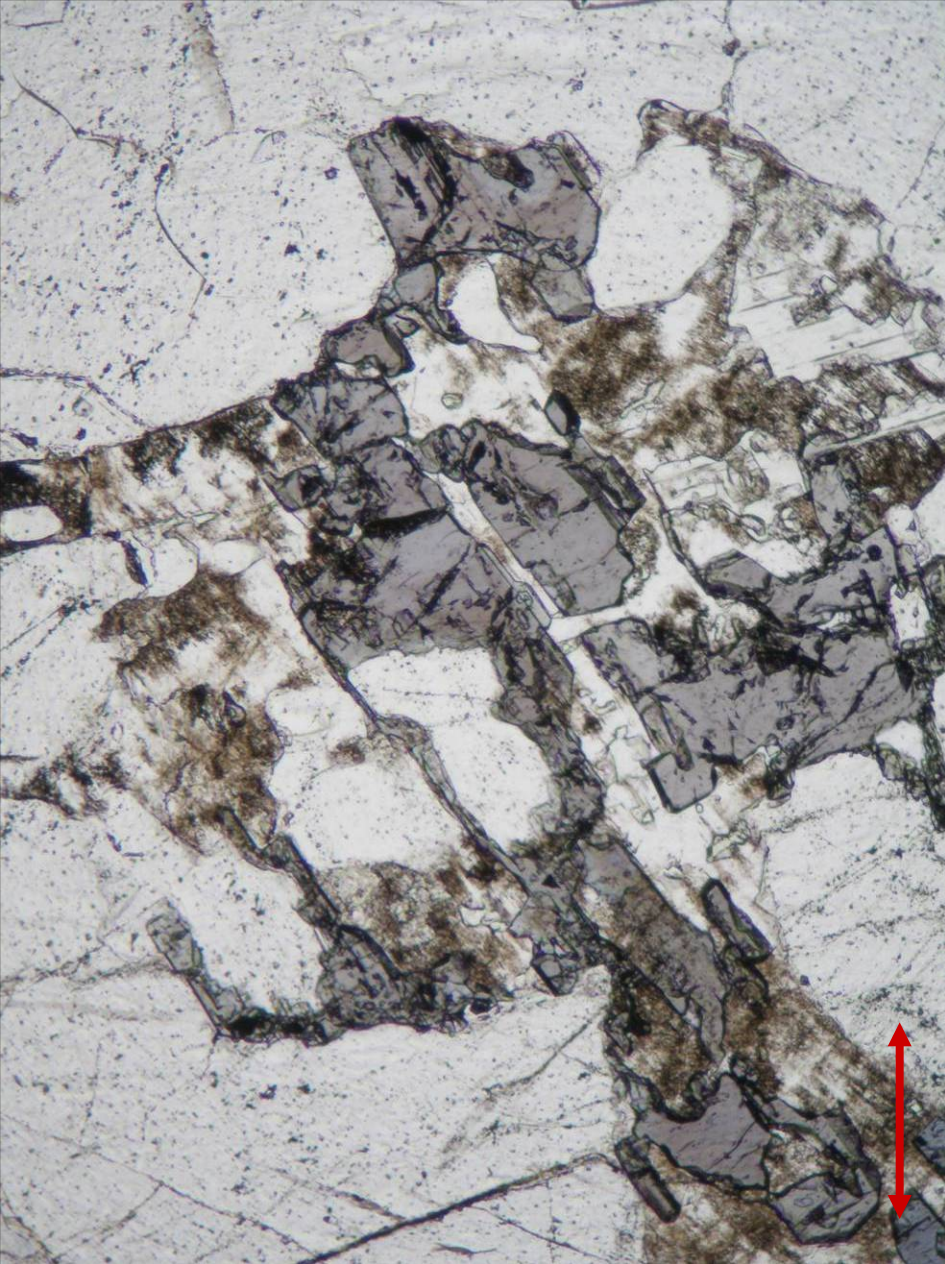
Schorl in pegmatite from Maršikov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.8 mm. Photo: JiZi.



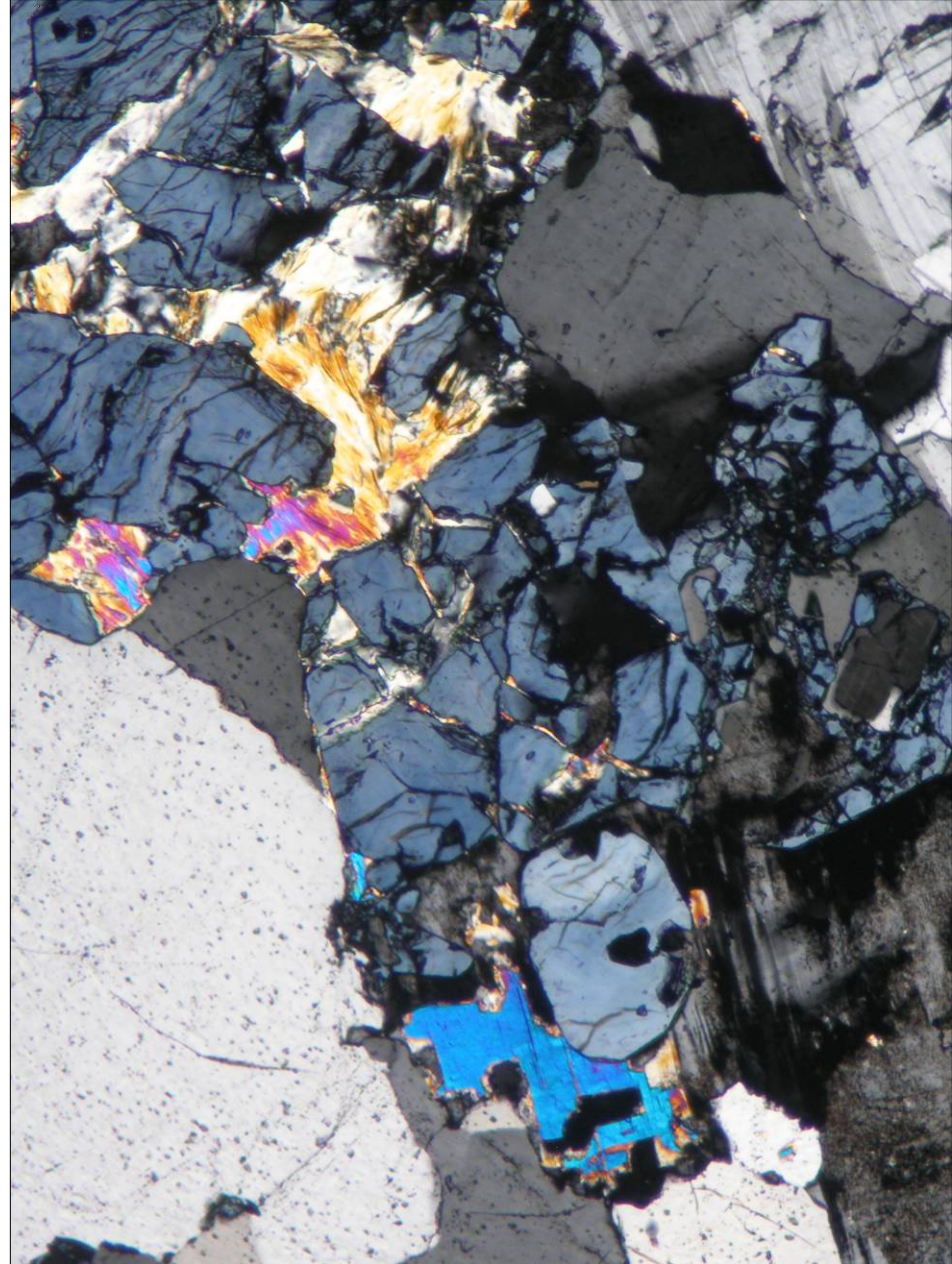
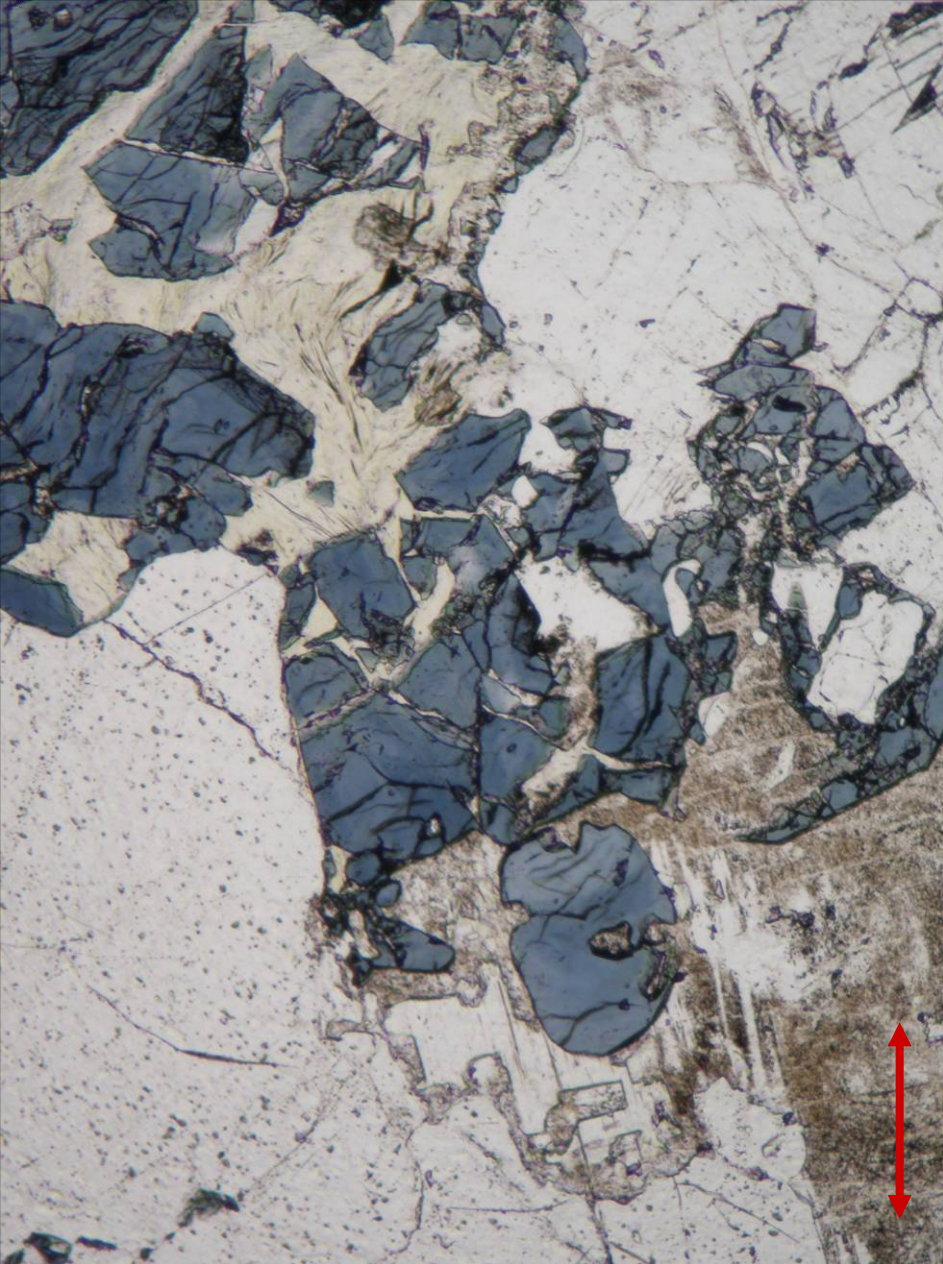
Pleochroism of schorl in pegmatite from Maršikov, the Czech Republic; PPL. Width of fields of view is ca. 1.8 mm. Photo: JiZi.



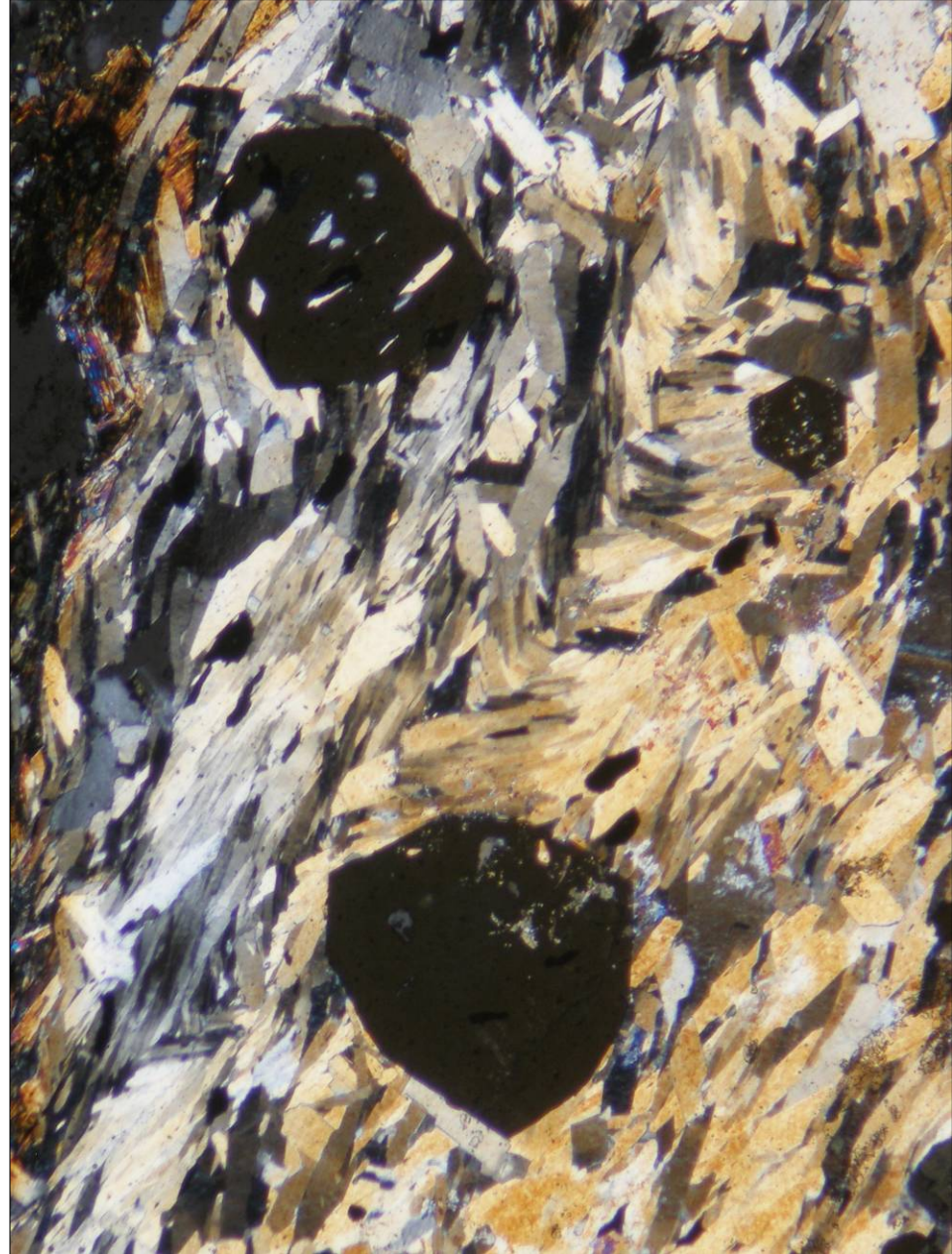
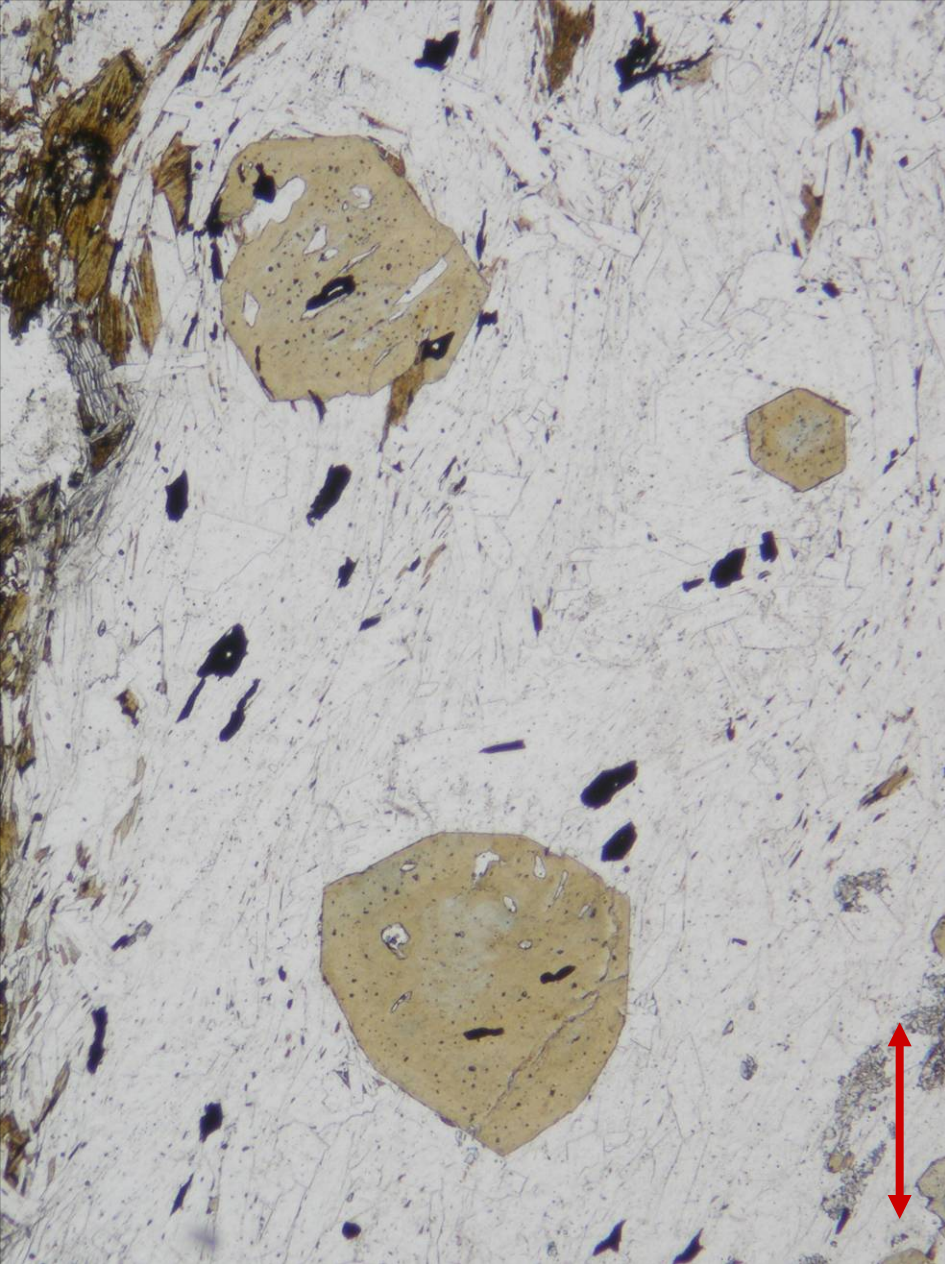
Schorl in pegmatite from Maršíkov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.8 mm. Photo: JiZi.



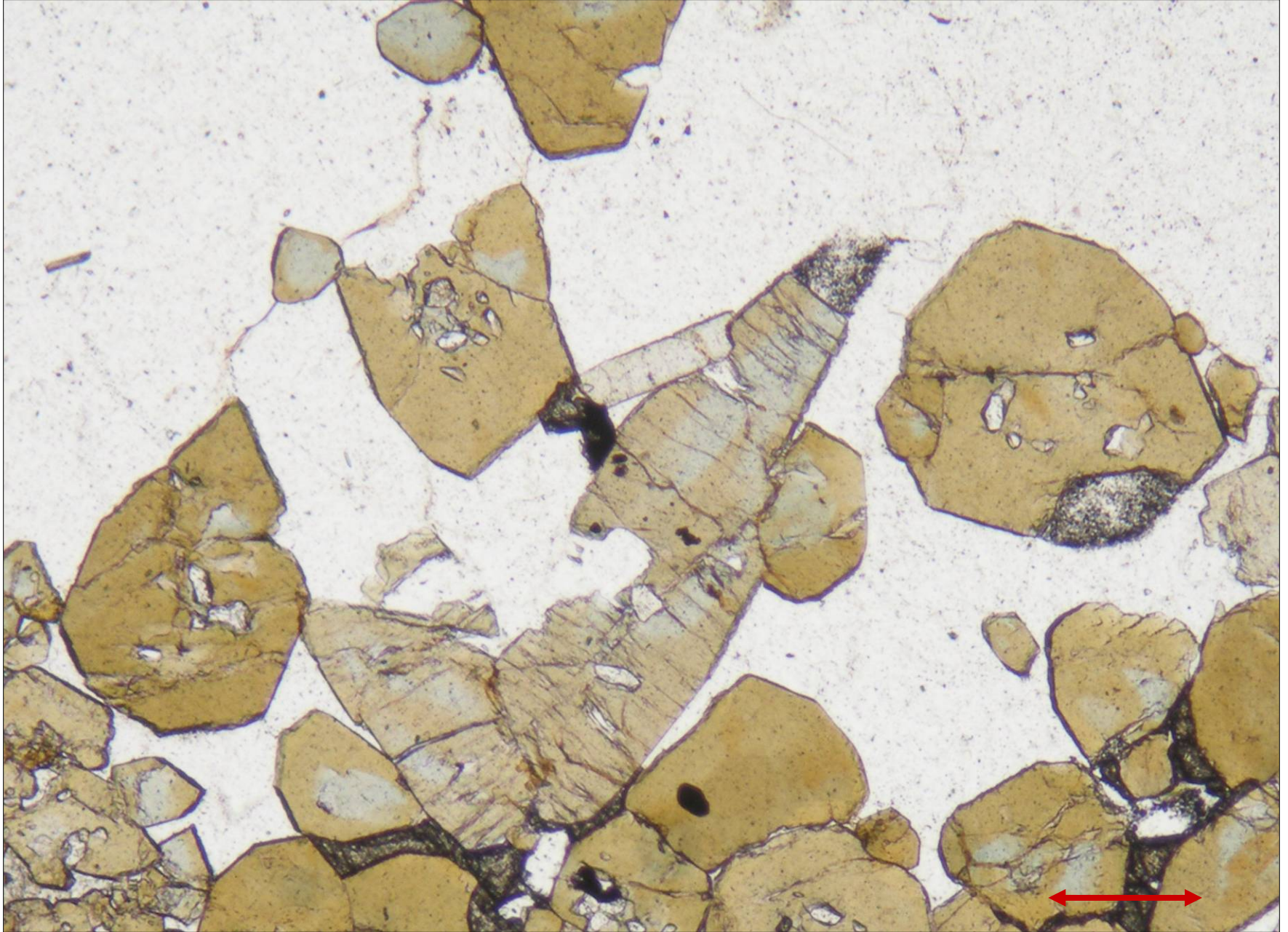
Schorl in pegmatite from Maršikov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.8 mm. Photo: JiZi.



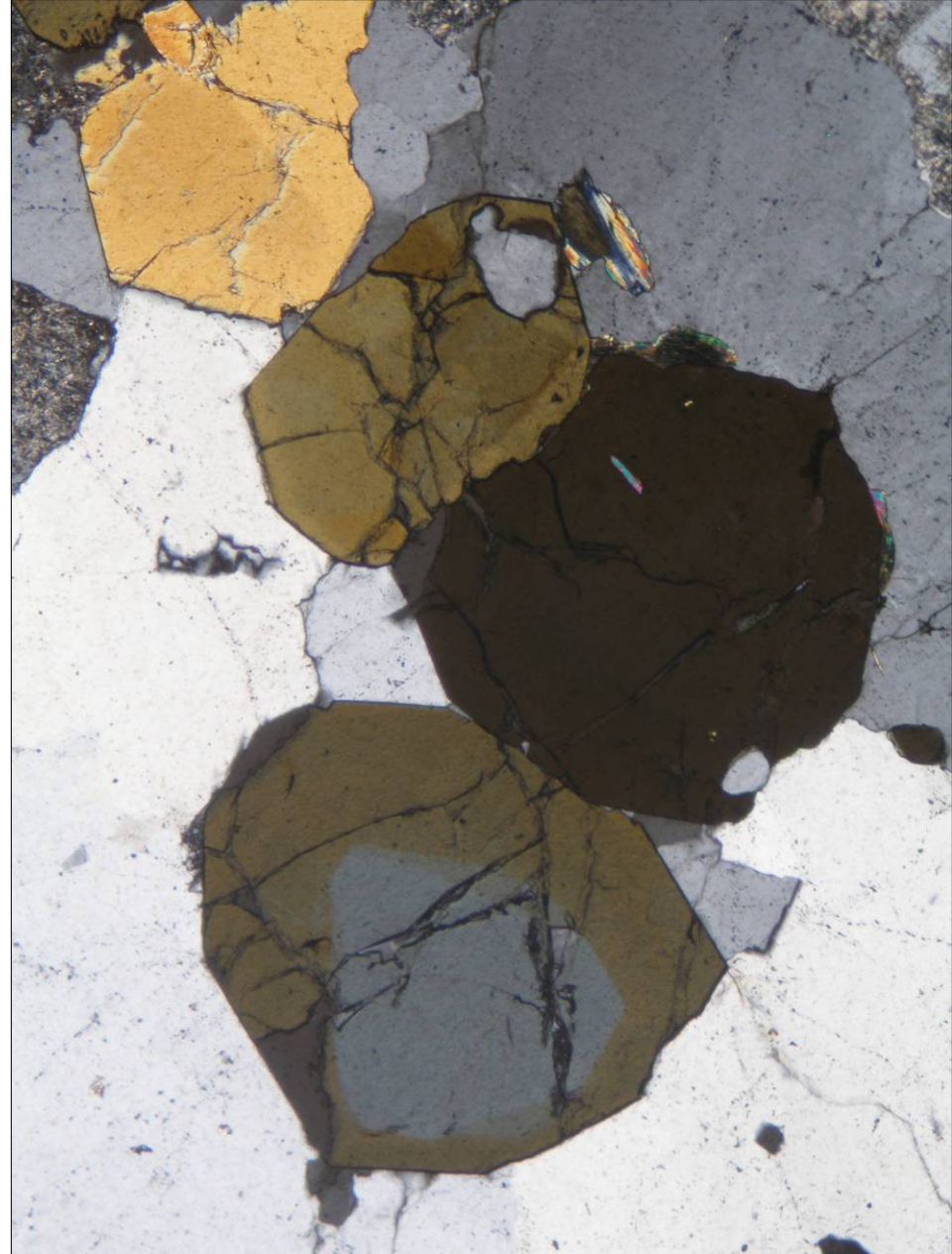
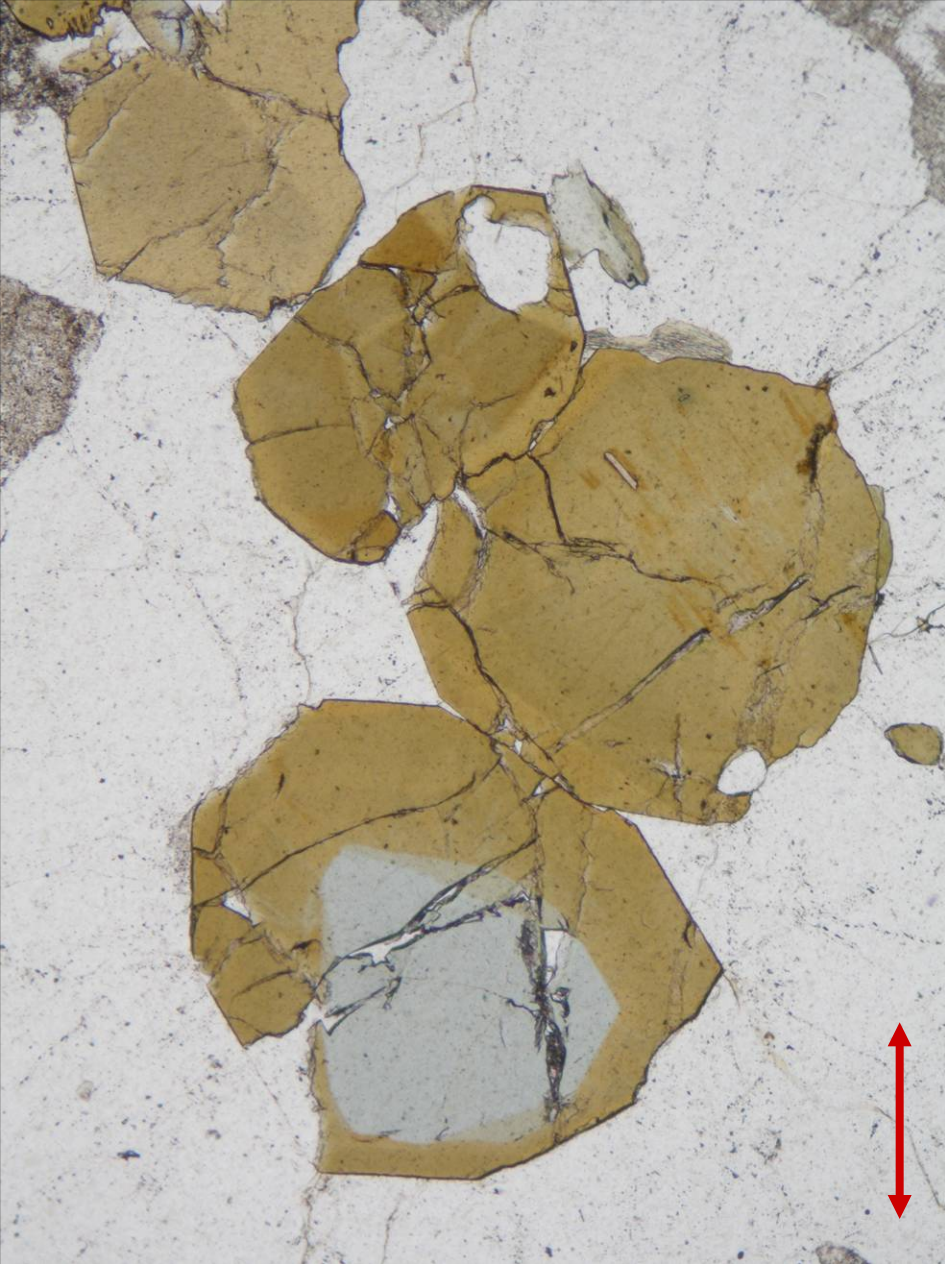
Schorl in pegmatite from Maršikov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.8 mm. Photo: JiZi.



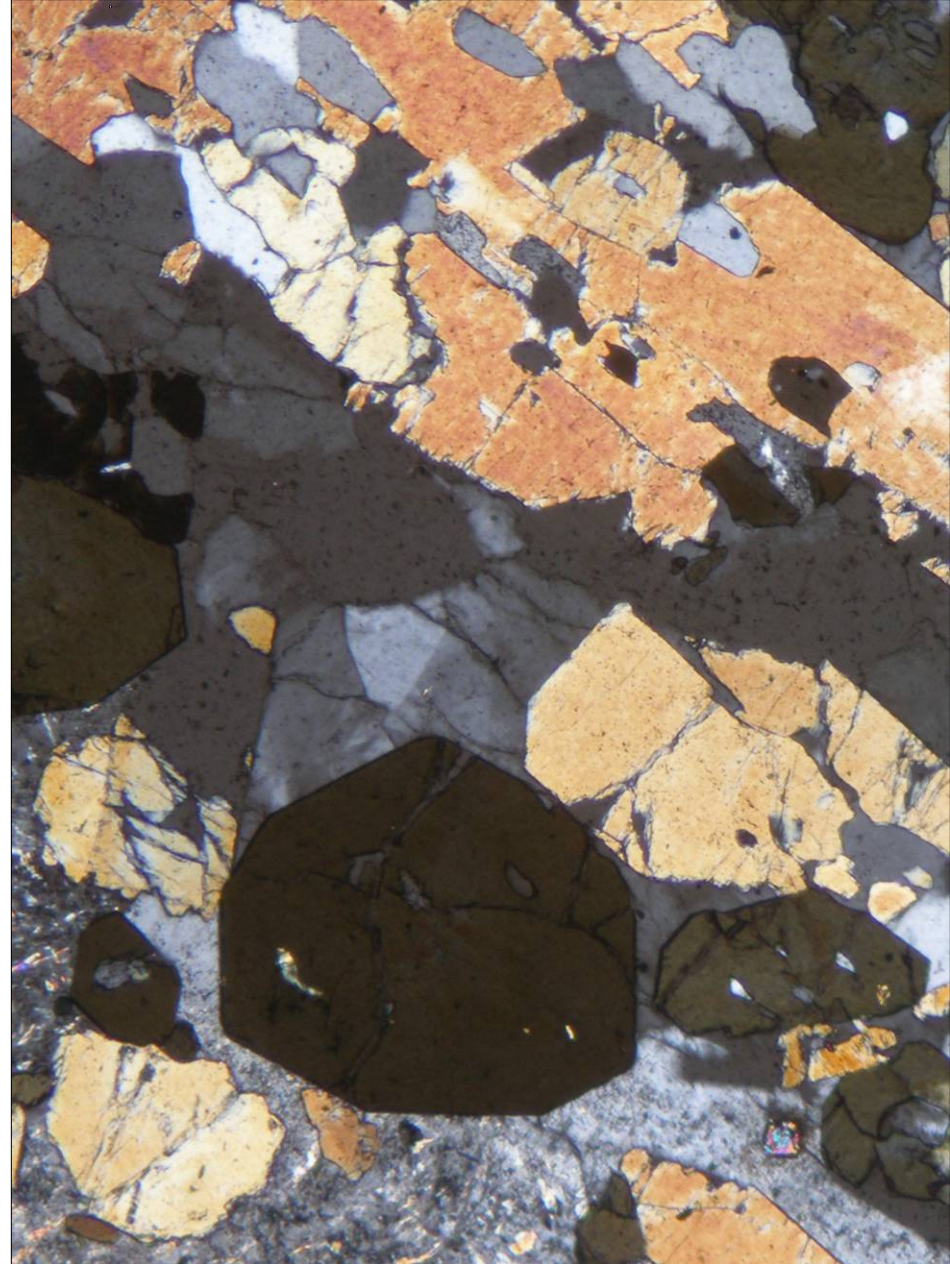
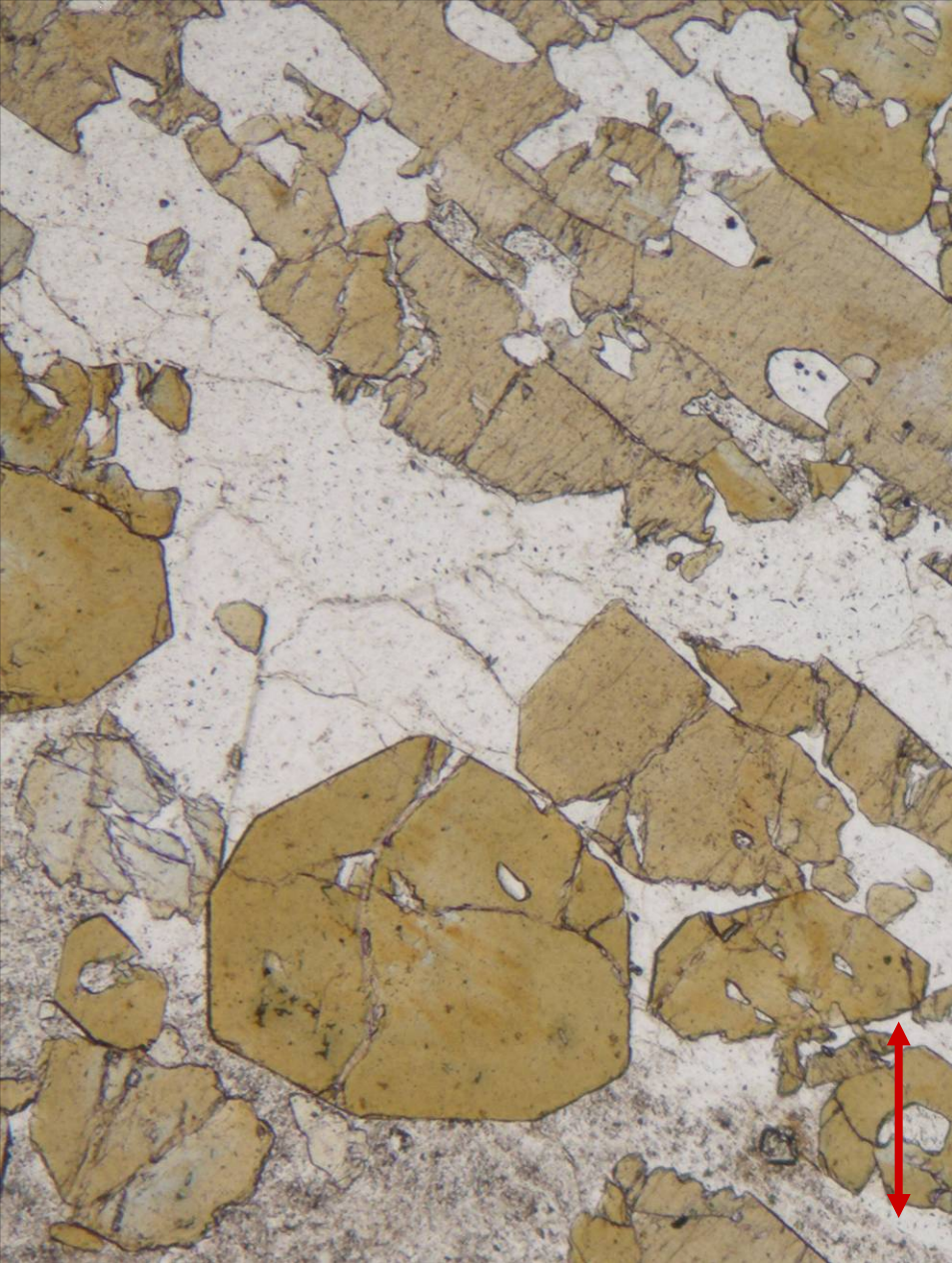
Tourmaline in mica schist from Horní Lipová, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.3 mm. Photo: JiZi.



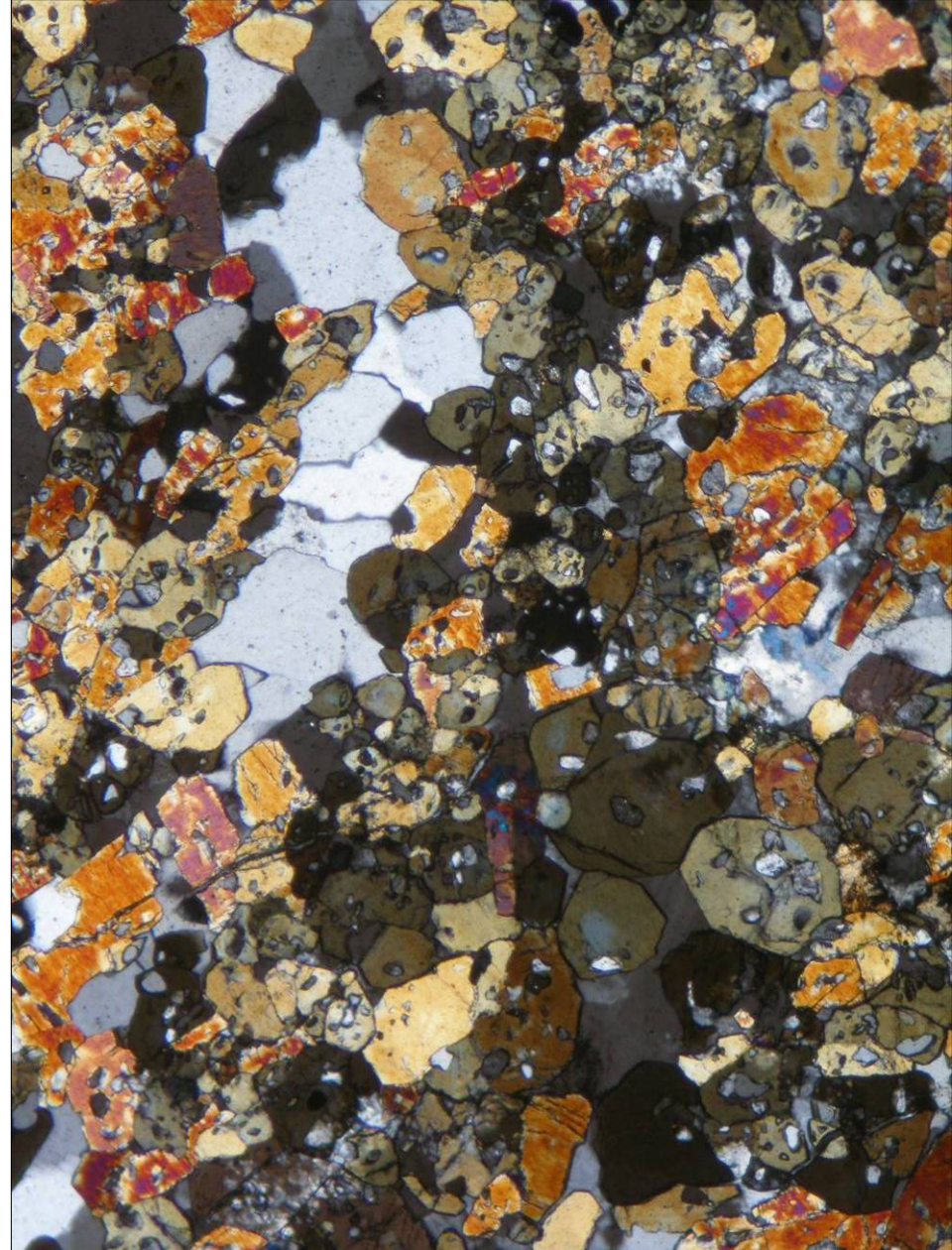
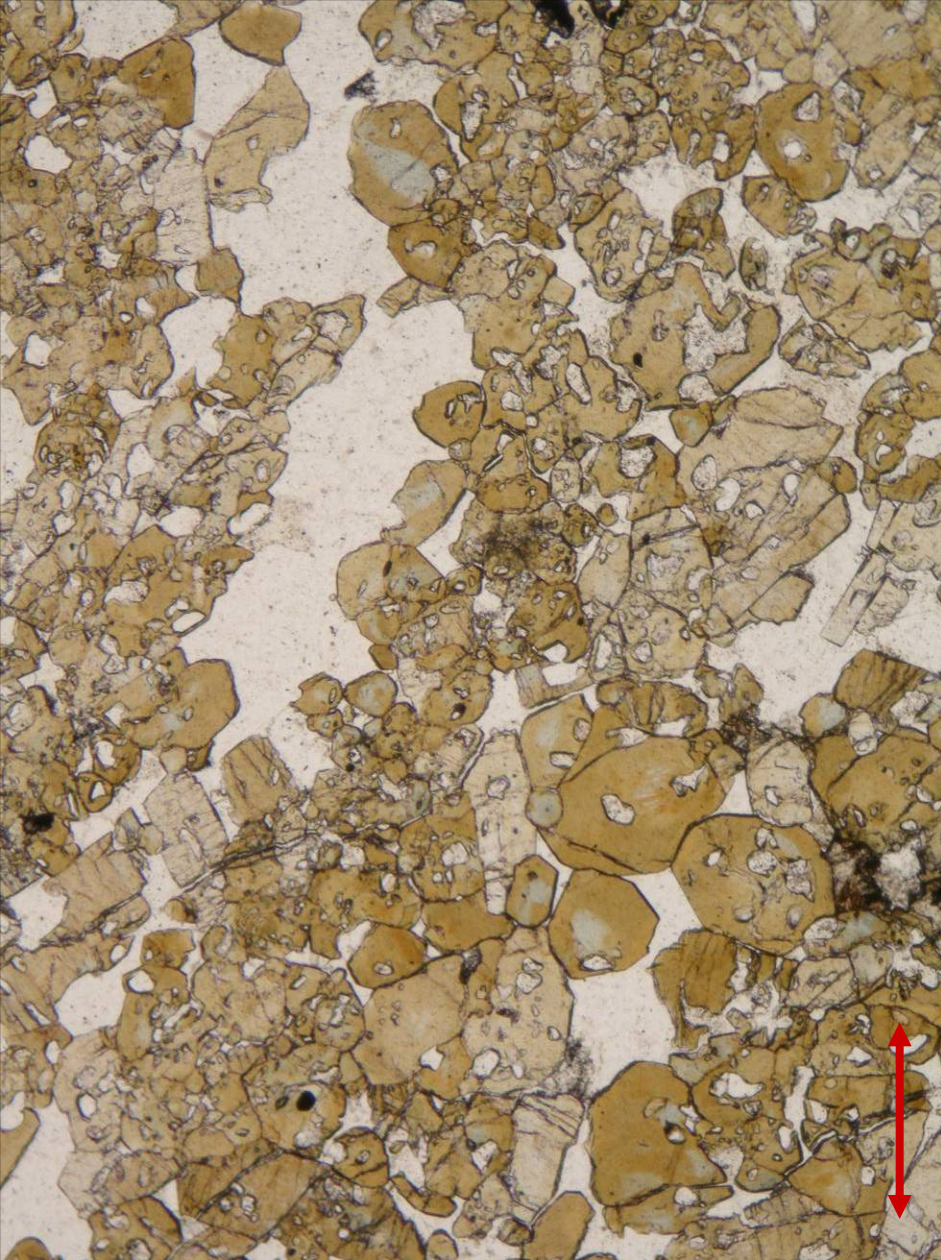
Tourmaline in a quartz vein in mica schist from Horní Lipová, the Czech Republic; PPL. Field of view is ca. 1.2 mm wide. Photo: JiZi.



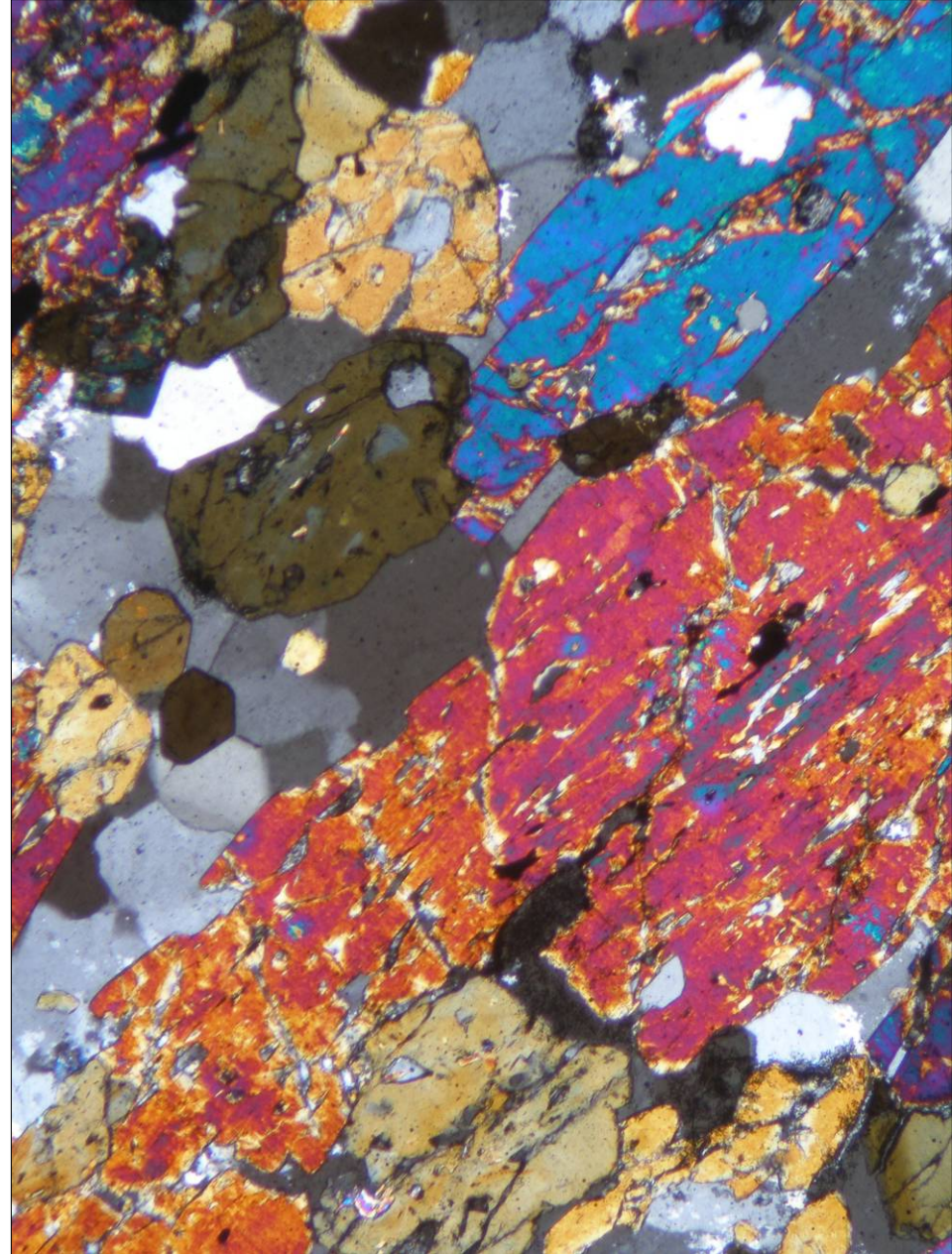
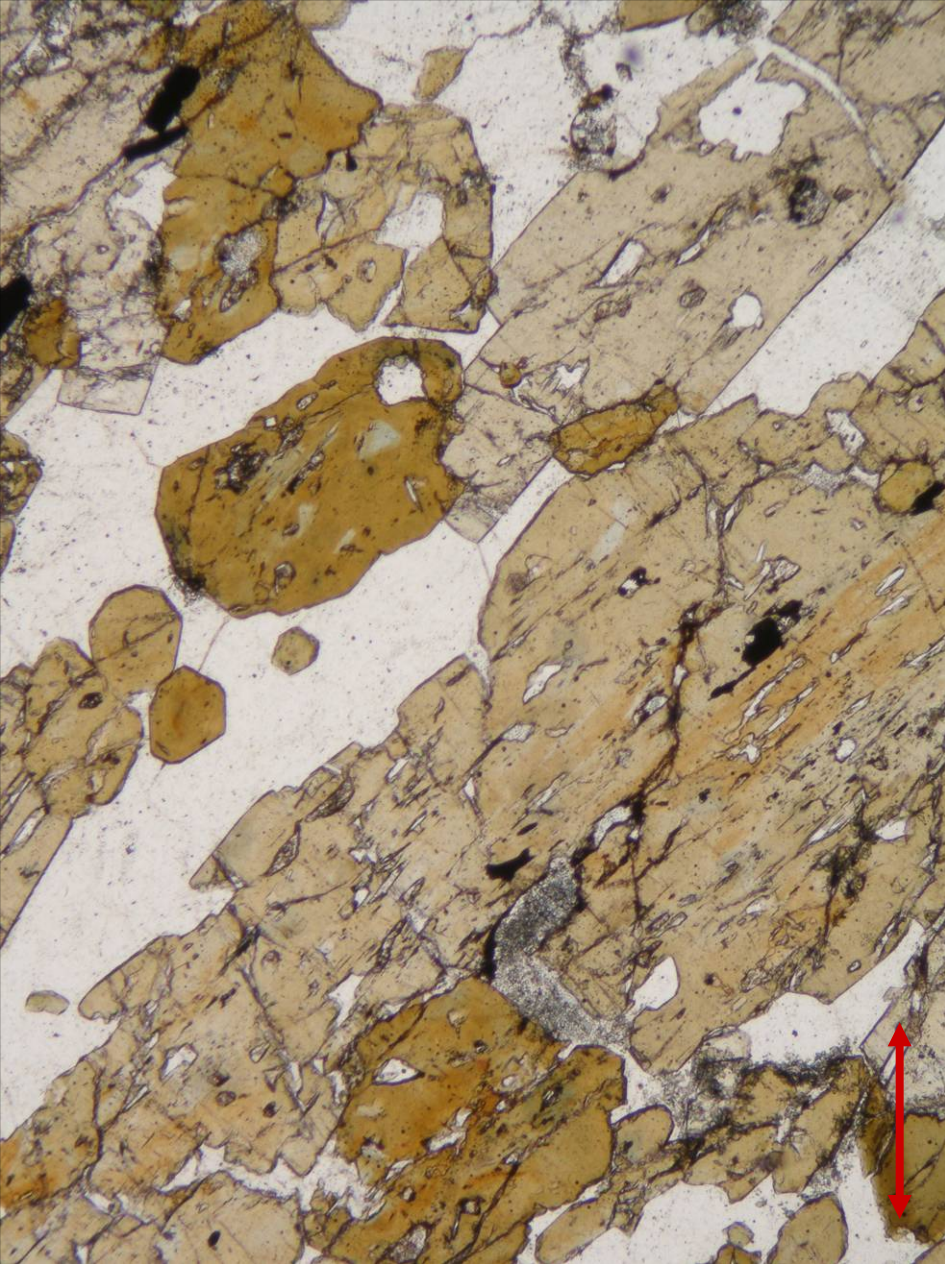
Color zoning of tourmaline in a quartz vein in mica schist from Horní Lipová, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.7 mm. Photo: JiZi.



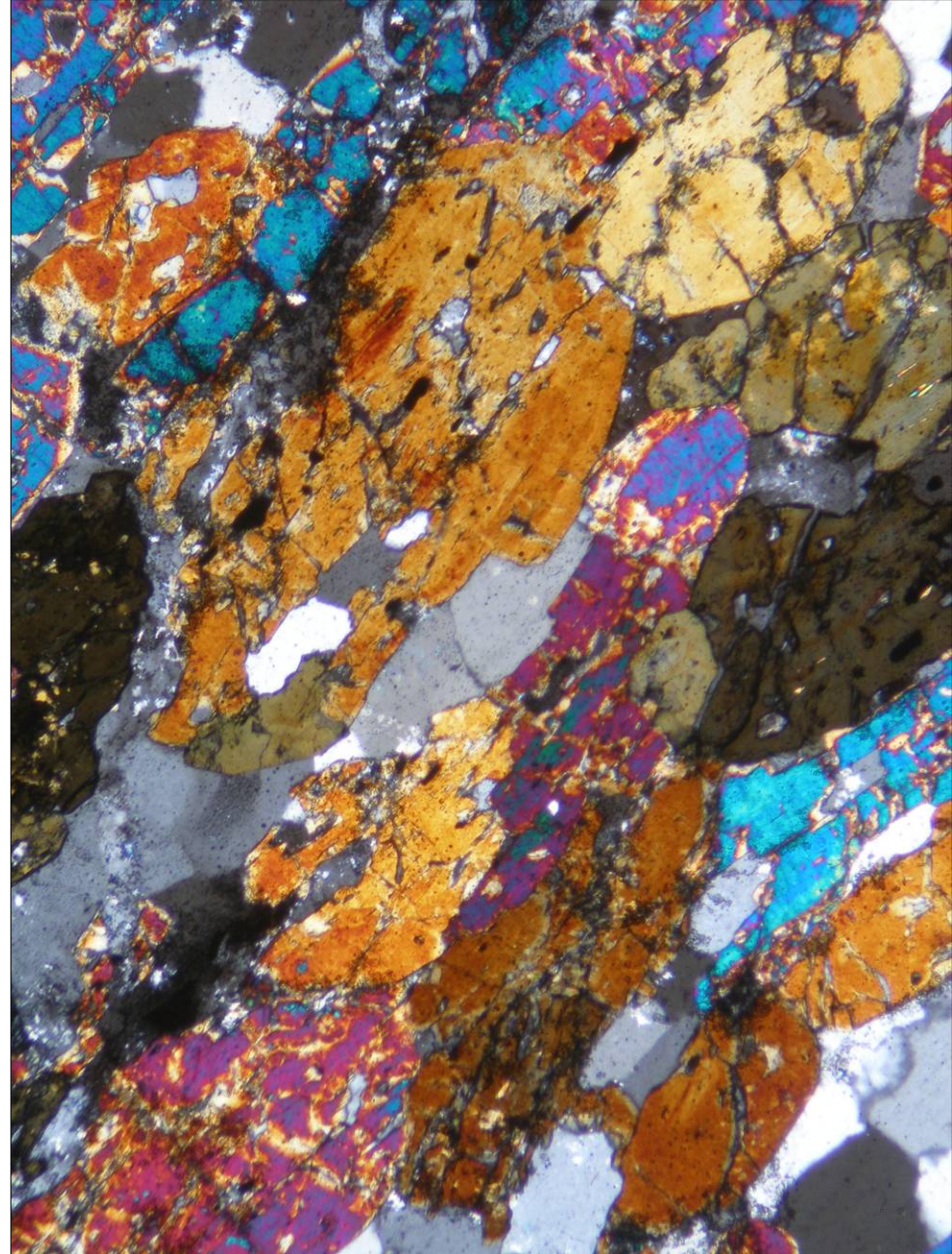
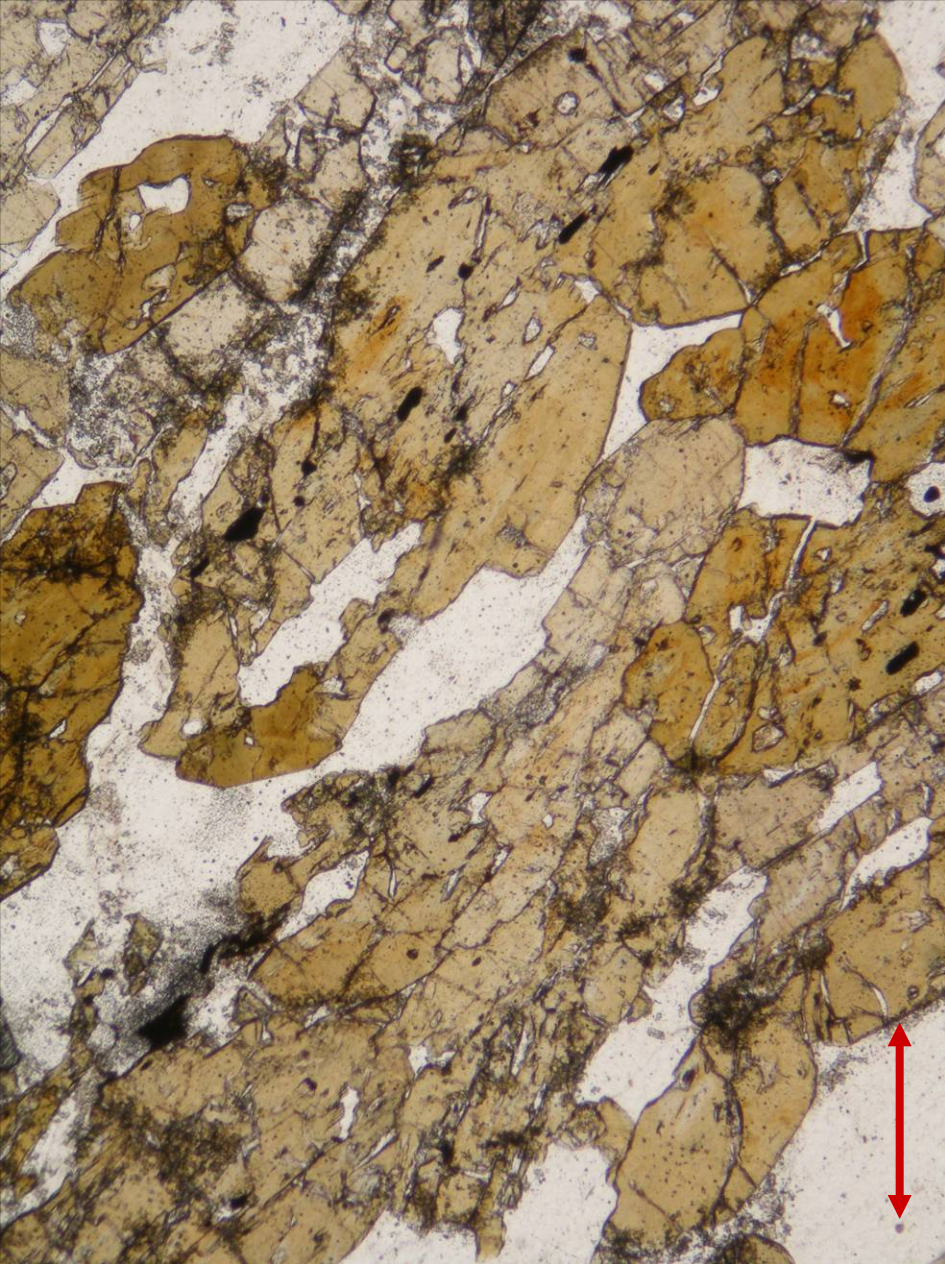
Tourmaline in a quartz vein in mica schist from Horní Lipová, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.2 mm. Photo: JiZi.



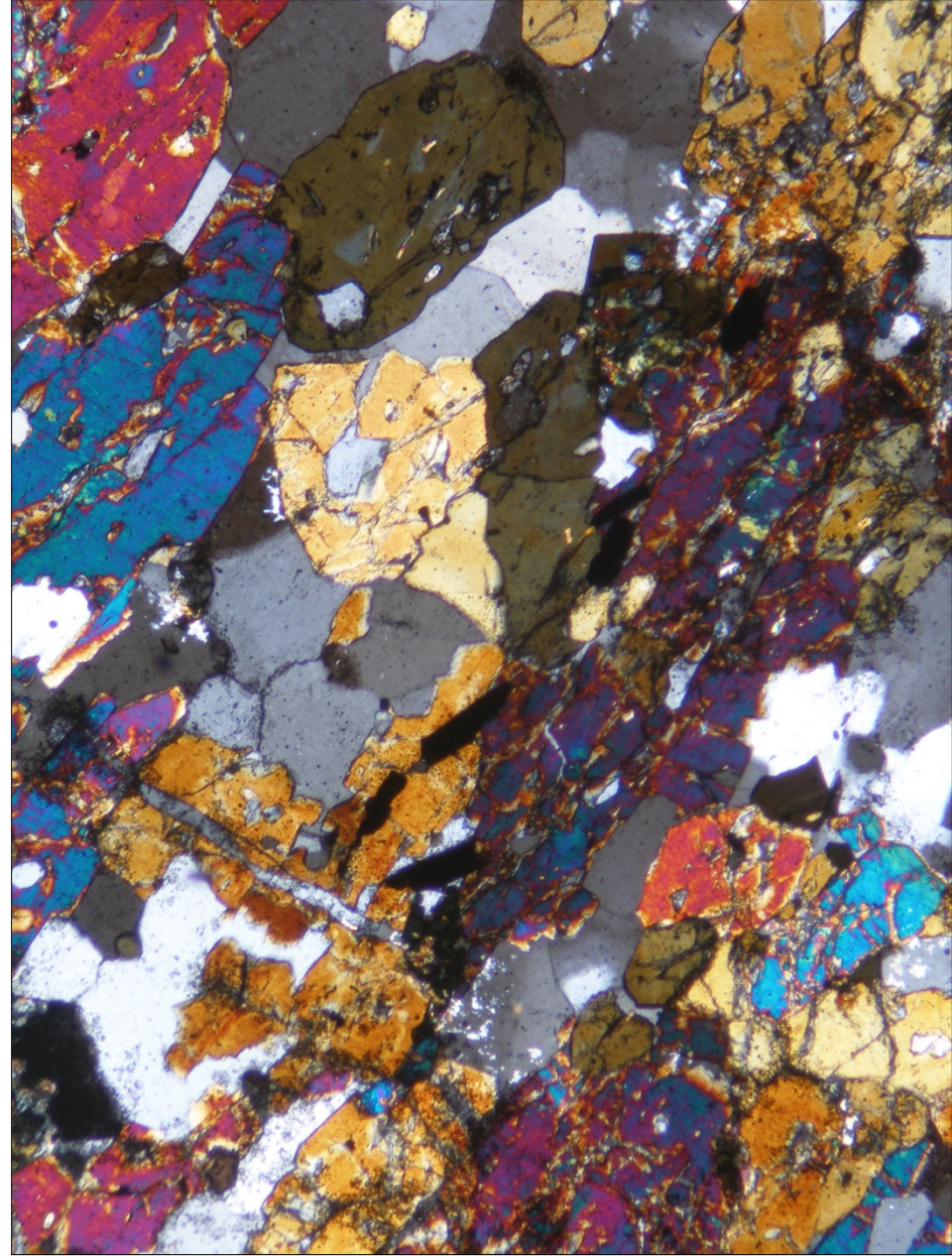
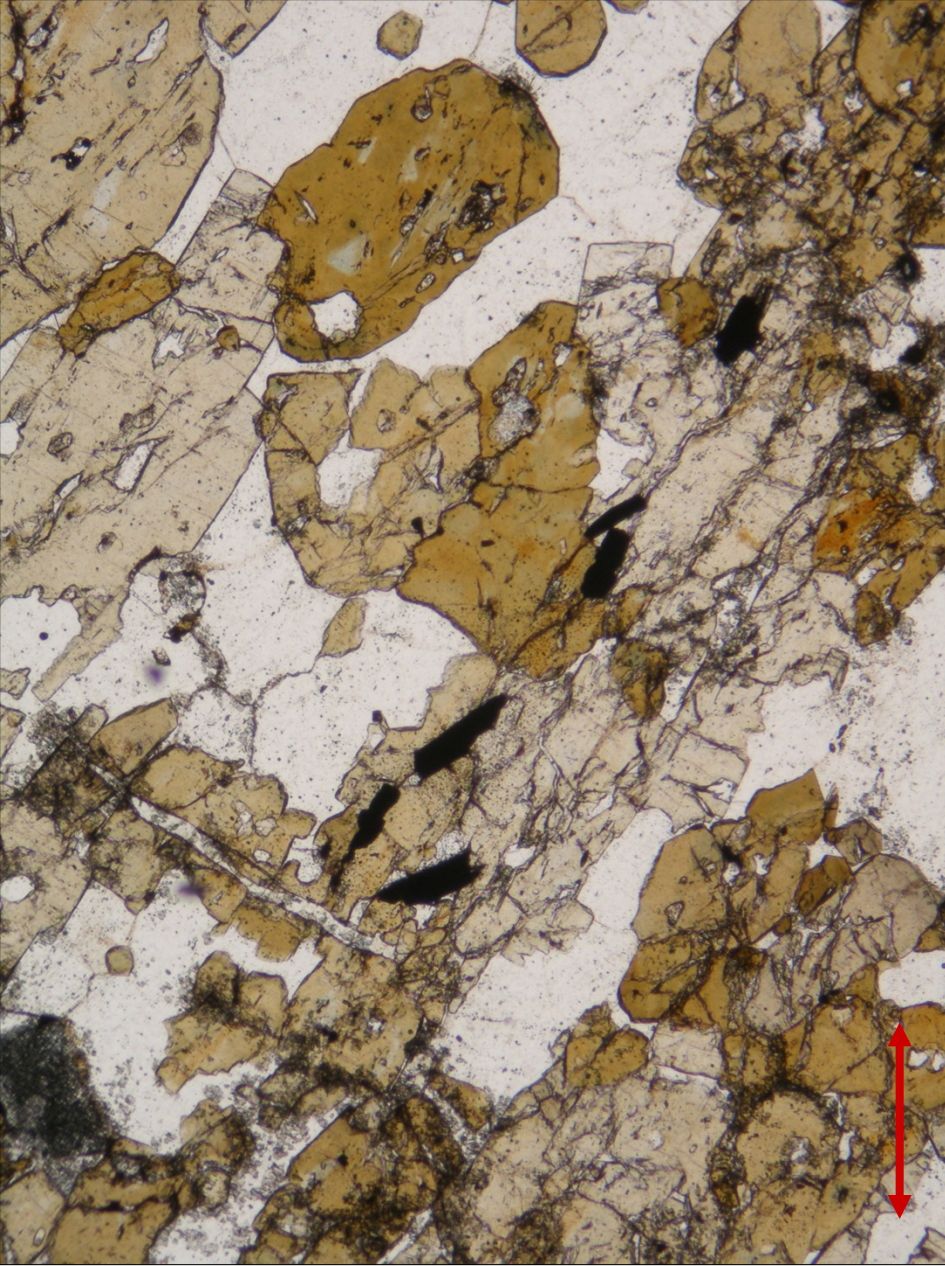
Tourmaline in tourmalinite from Horní Lipová, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.7 mm. Photo: JiZi.



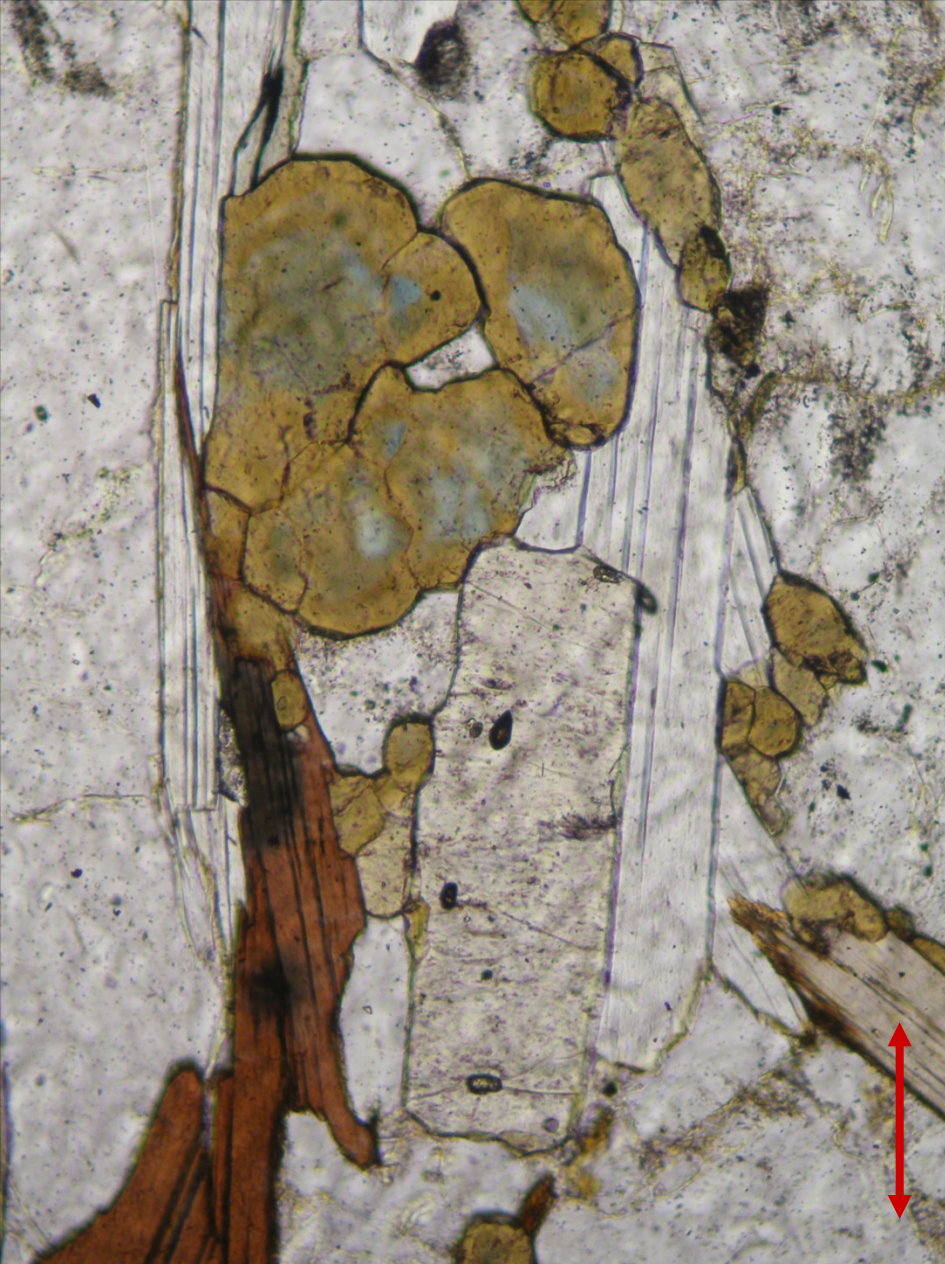
Tourmaline in tourmalinite from Horní Lipová, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.8 mm. Photo: JiZi.



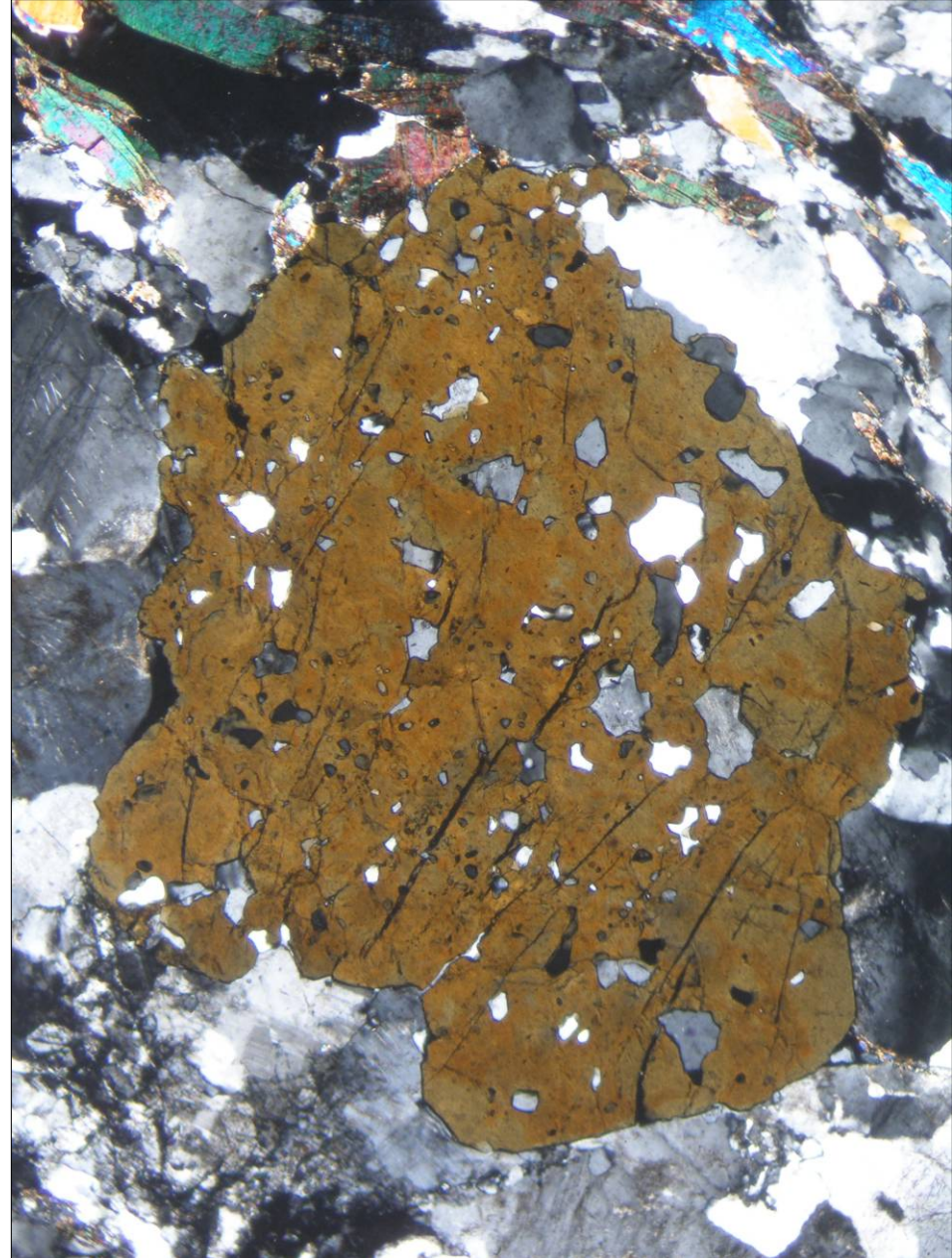
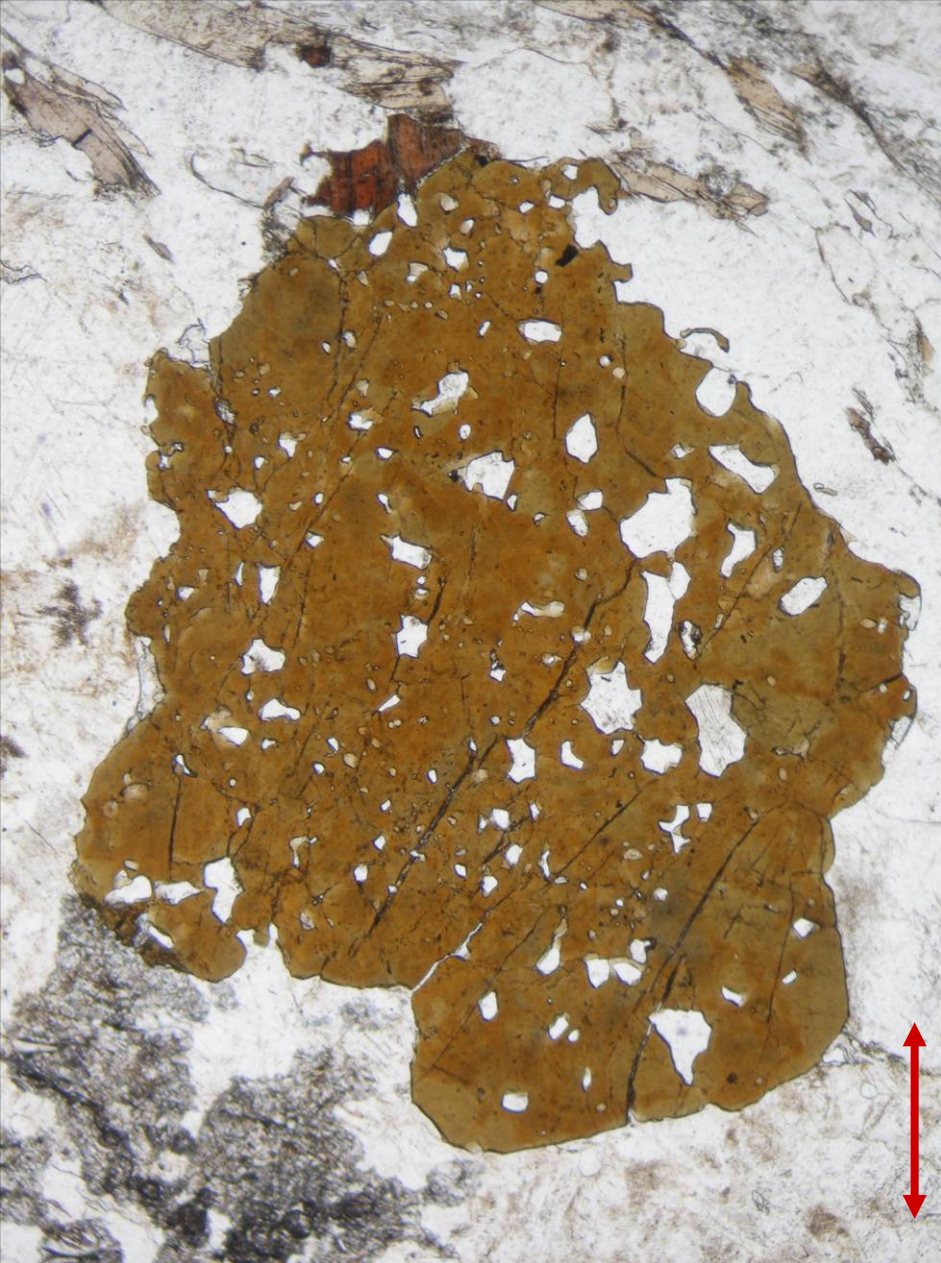
Tourmaline in tourmalinite from Horní Lipová, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.8 mm. Photo: JiZi.



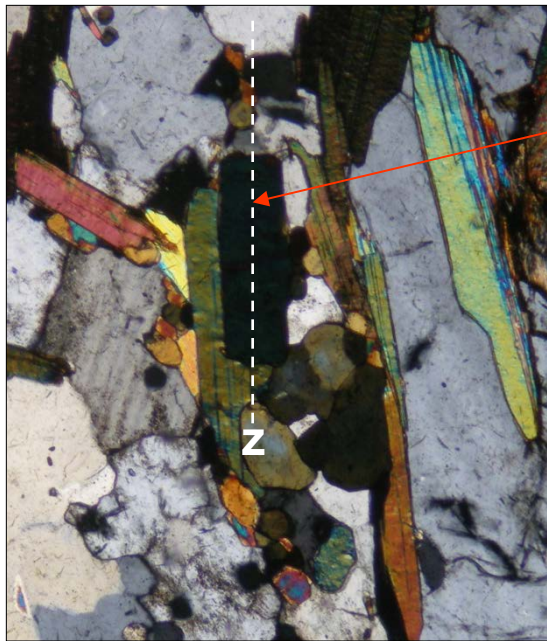
Tourmaline in tourmalinite from Horní Lipová, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.8 mm. Photo: JiZi.



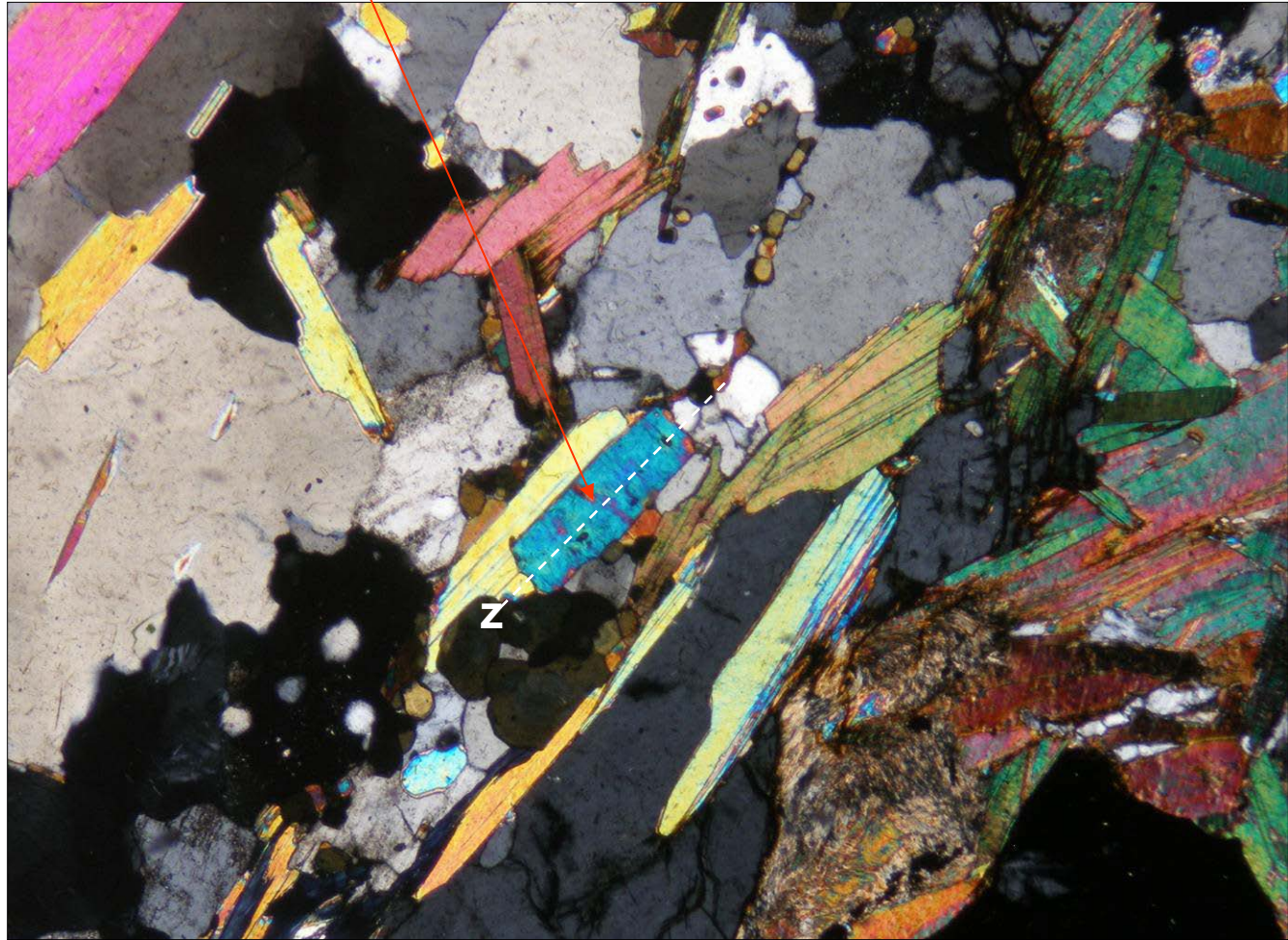
Color zoning and strong pleochroism of tourmaline in mica schist from Kovářová, the Czech Republic; PPL. Width of fields of view is ca. 0.7 mm. Photo: JiZi.



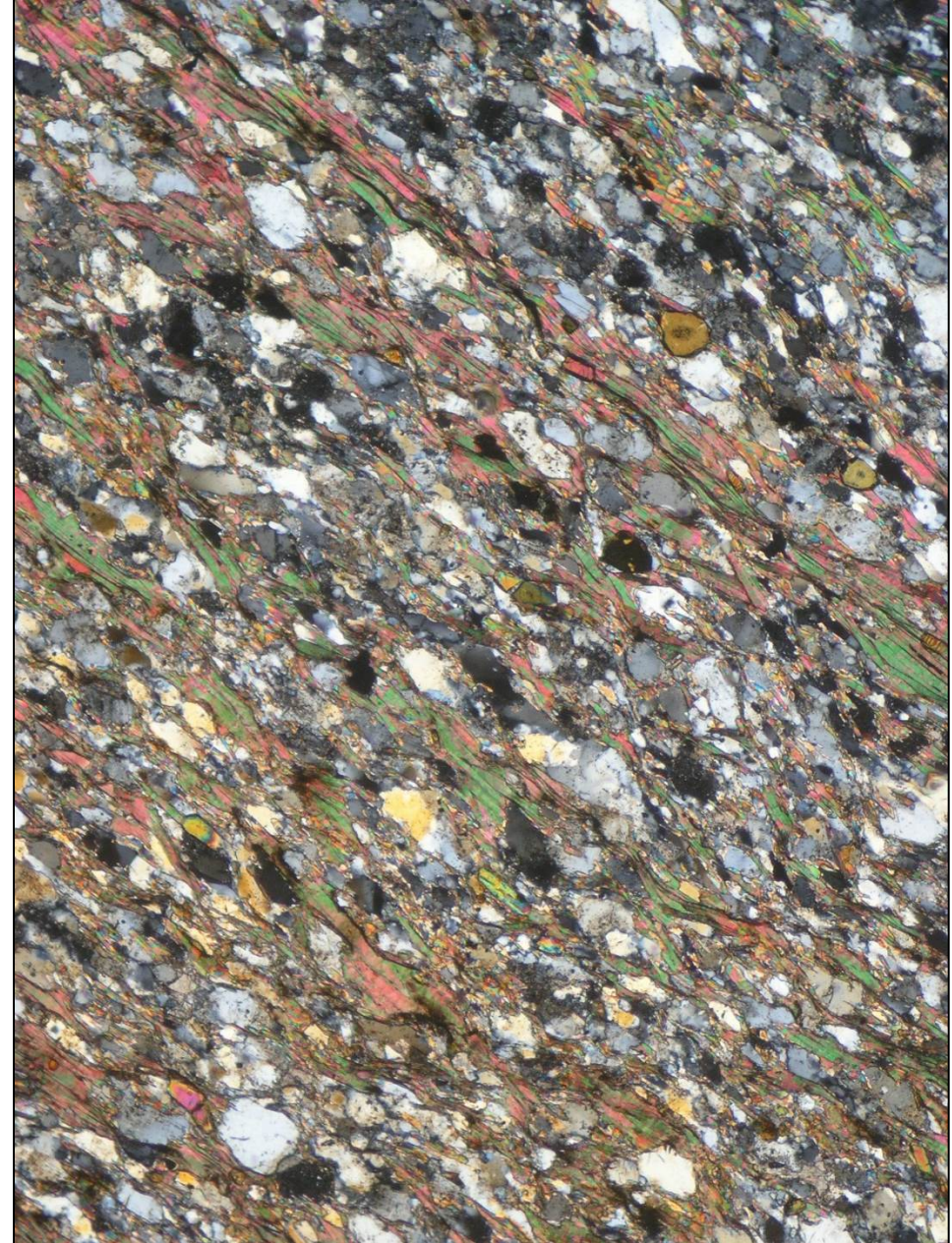
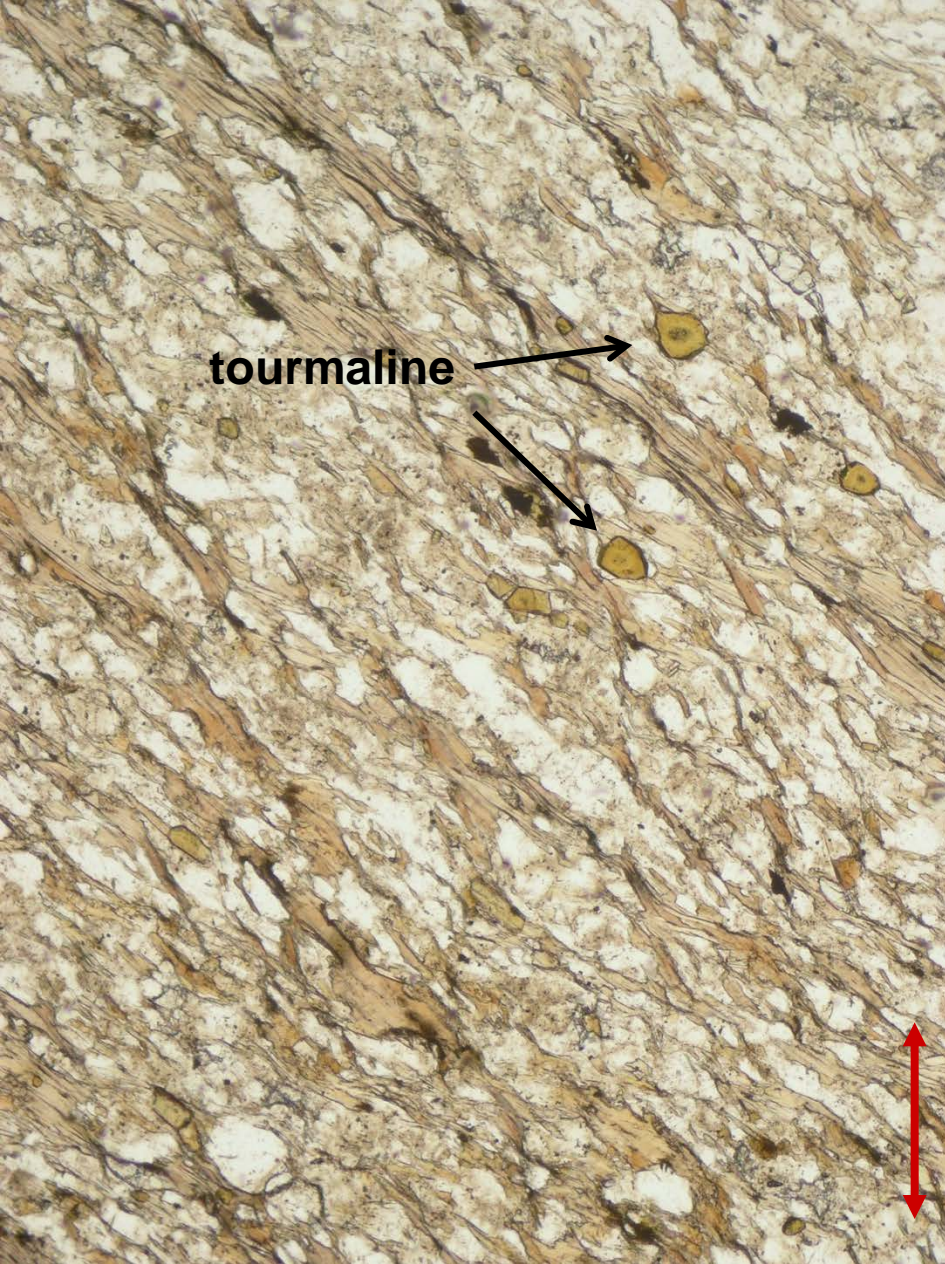
Tourmaline in gneiss from Nedvědice, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 2.0 mm. Photo: JiZi.



tourmaline



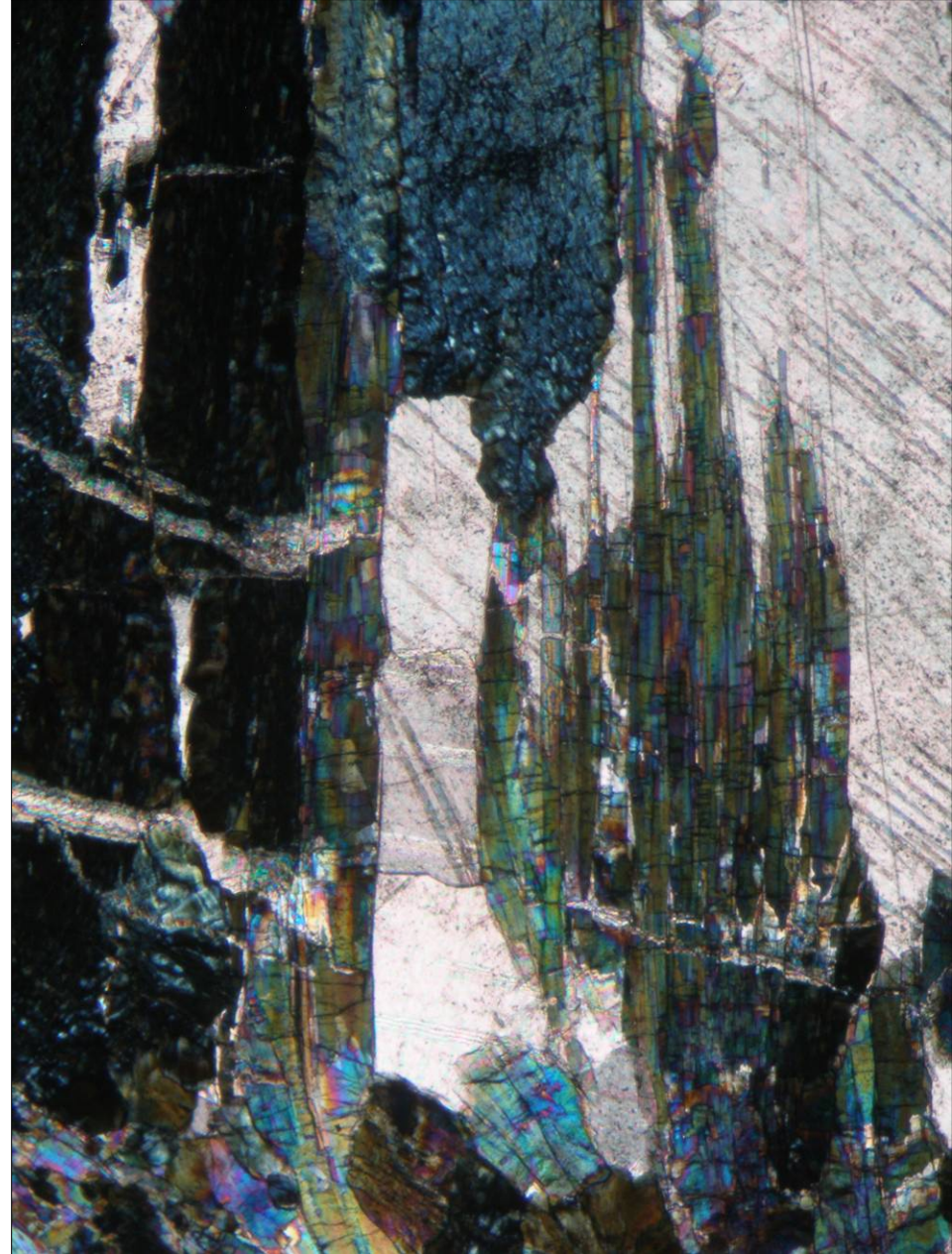
Tourmaline in mica schist from Štěpánov nad Svratkou, the Czech Republic; XPL. Field of view is ca. 2 mm wide. Photo: JiZi.



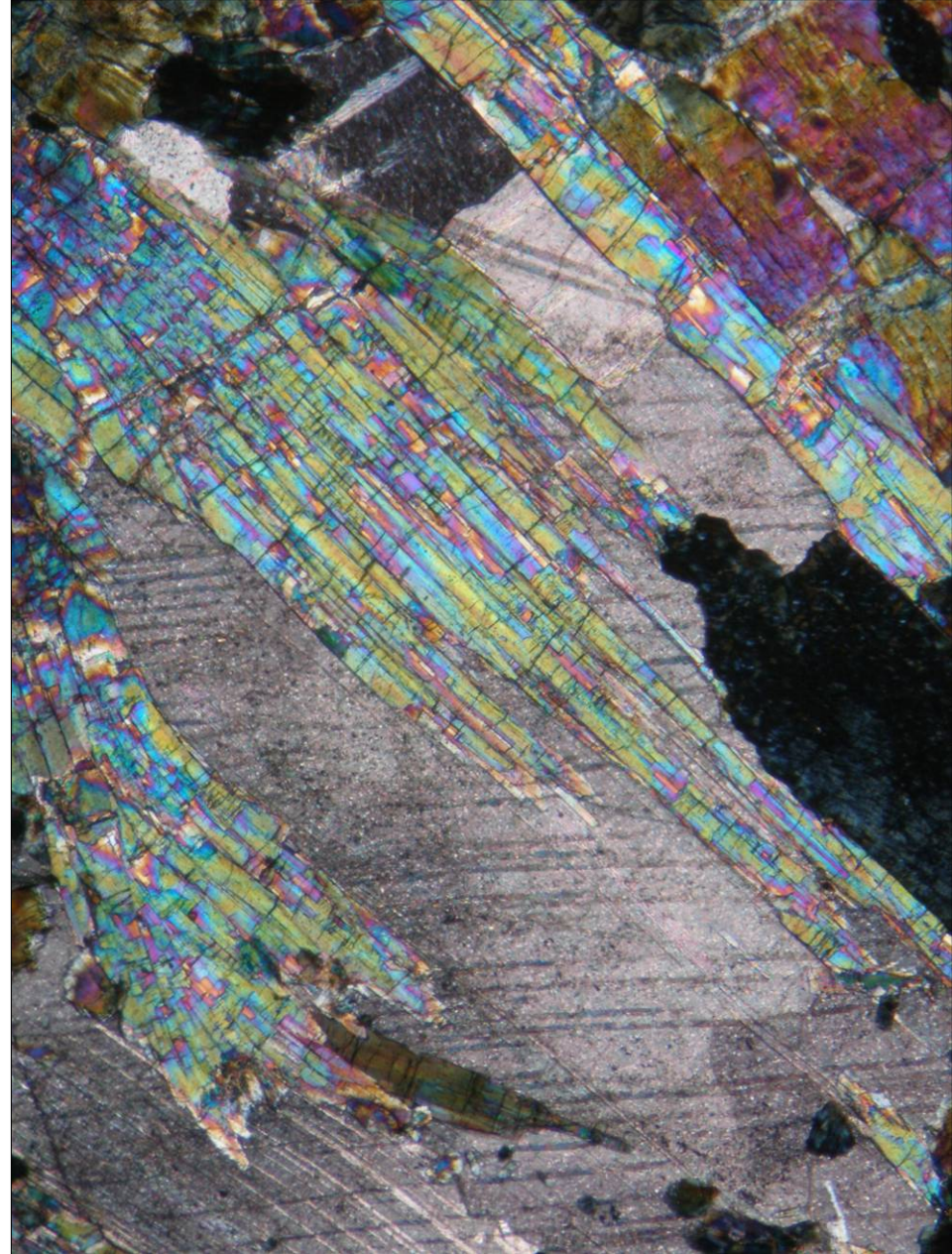
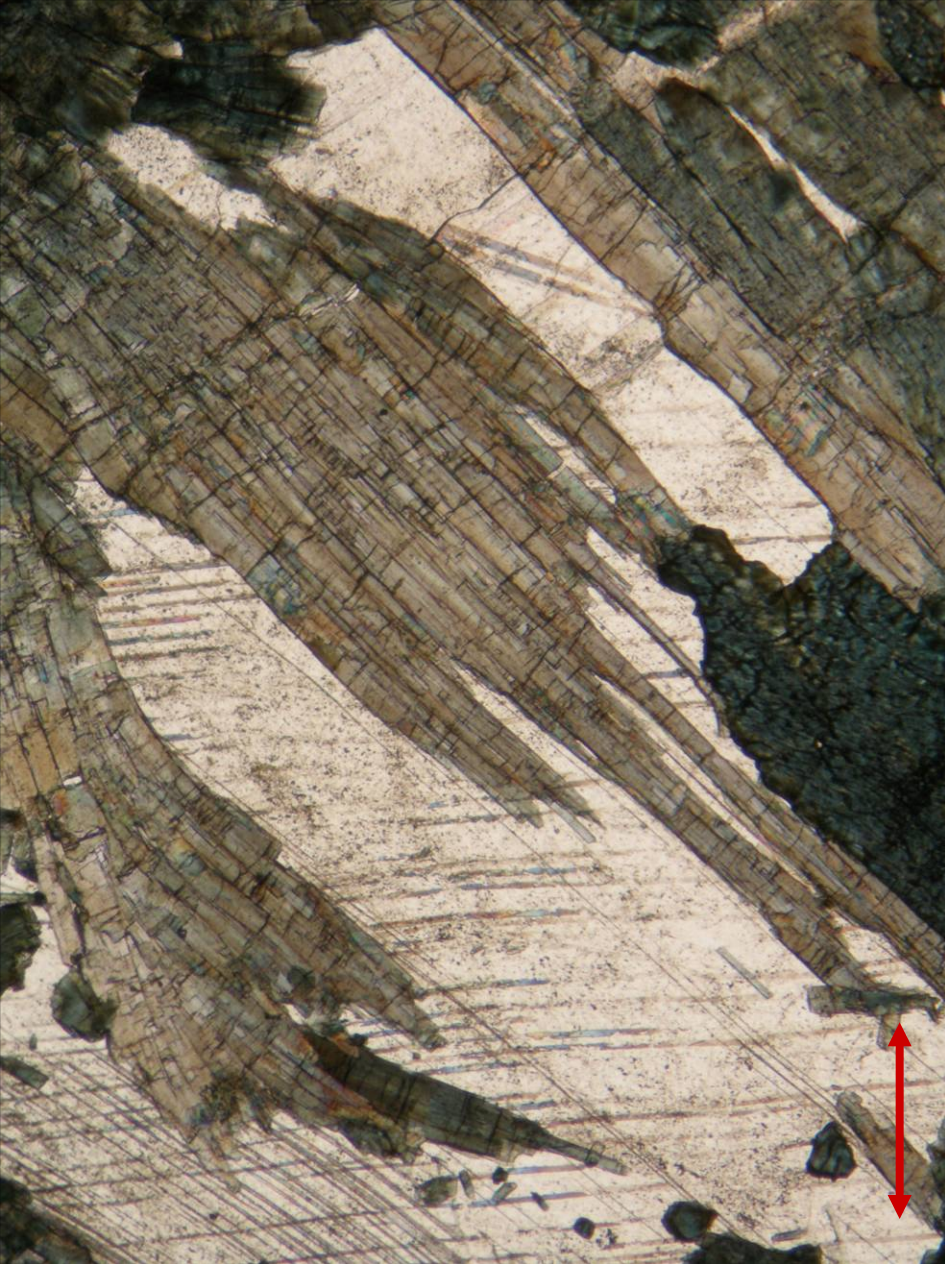
Tourmaline in phyllite from Nedvědice, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 2.4 mm. Photo: JiZi.



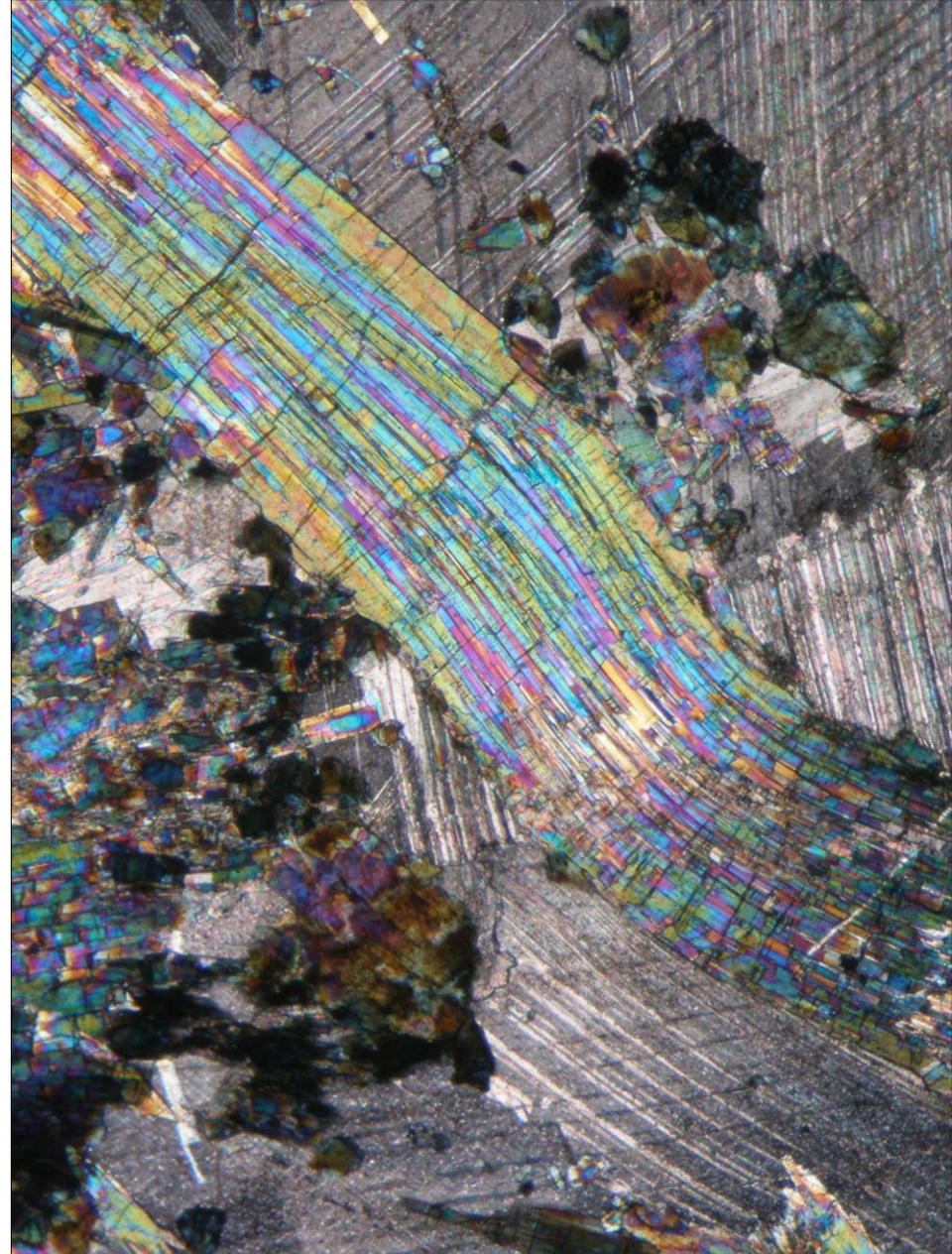
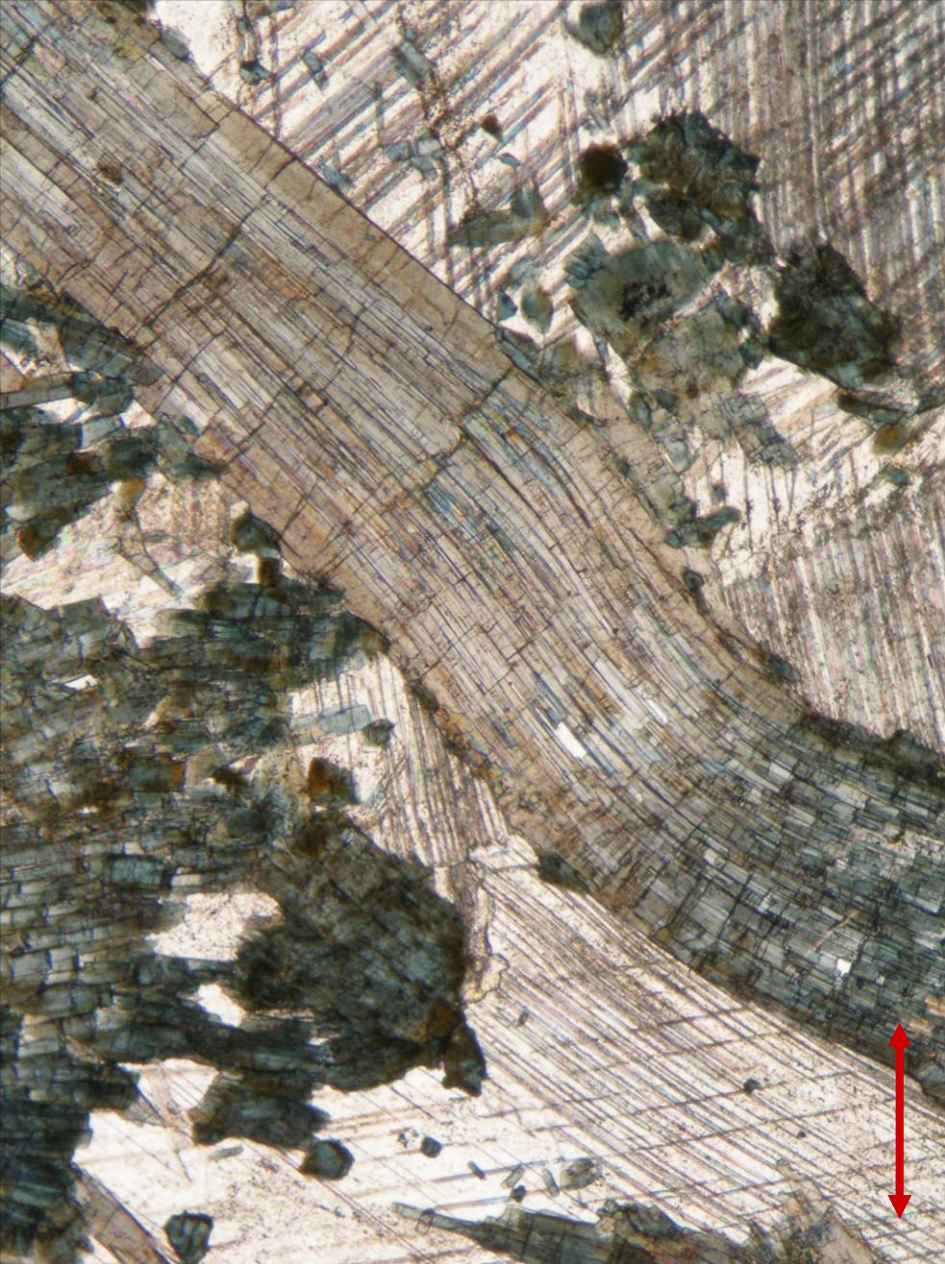
Strong pleochroism of tourmaline of the schorl-dravite series in a hydrothermal tourmaline-calcite vein from Chabičov, the Czech Republic; PPL. Width of fields of view is ca. 1.7 mm. Photo: JiZi.



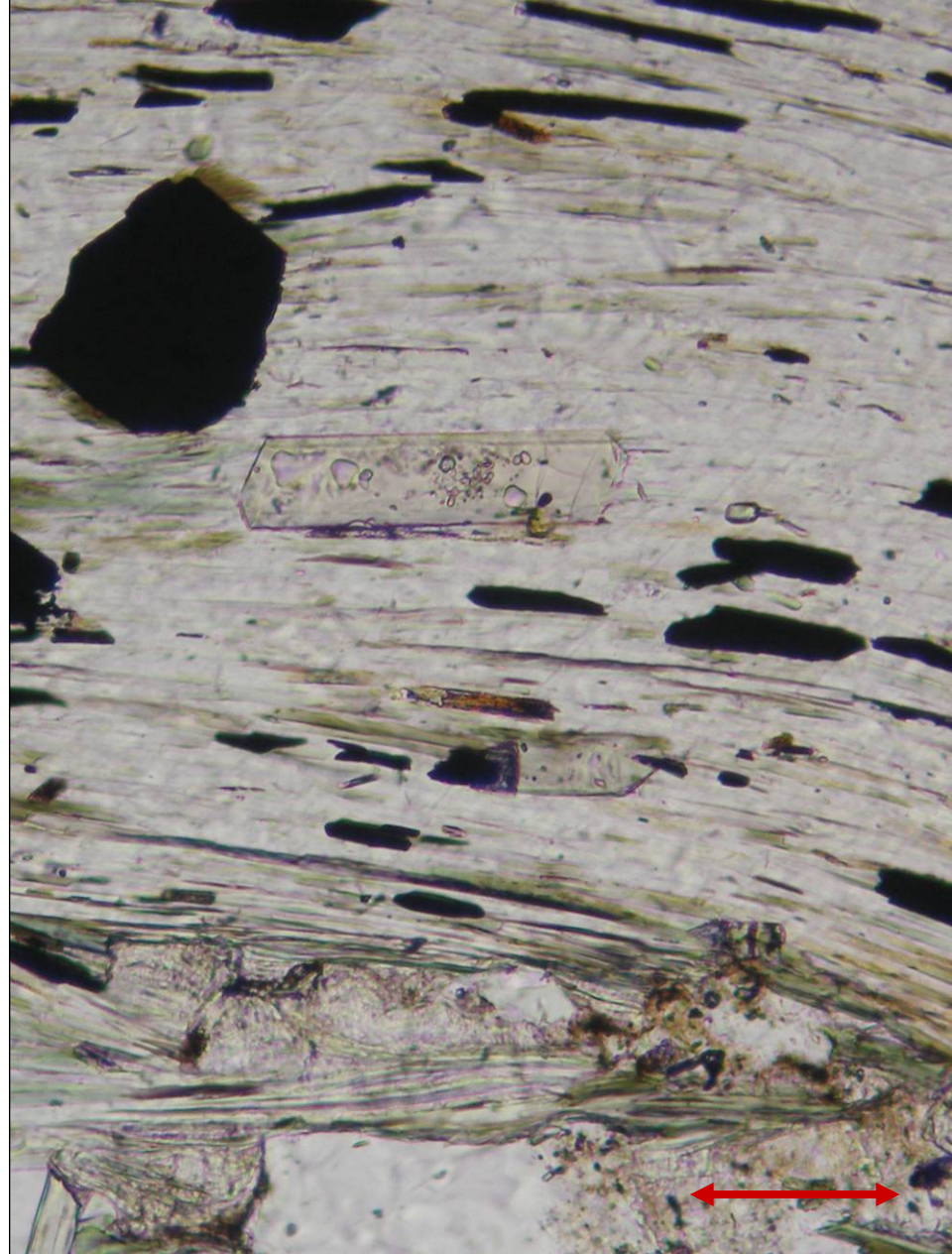
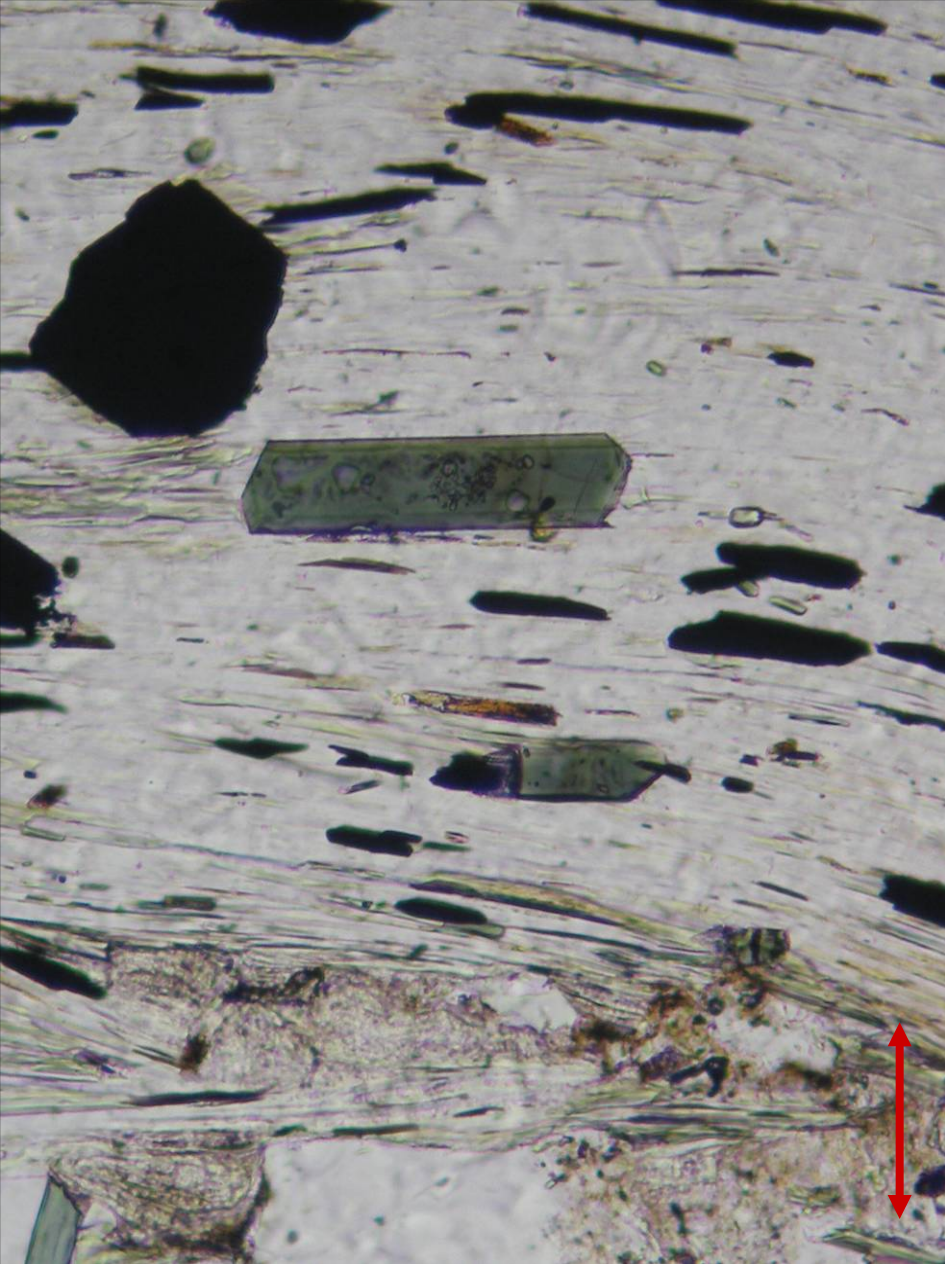
Tourmaline of the schorl-dravite series in a hydrothermal tourmaline-calcite vein from Chabičov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.7 mm. Photo: JiZi.



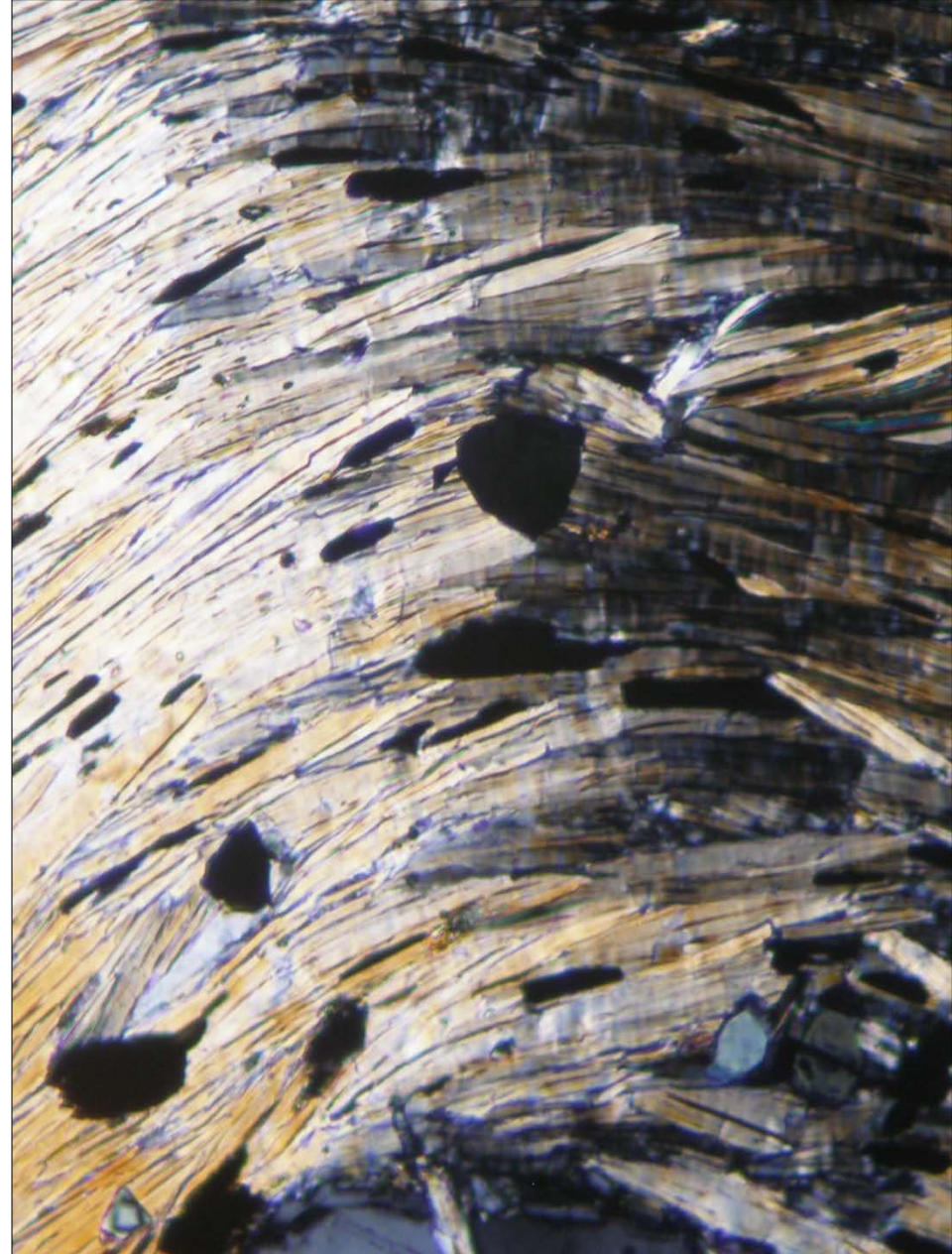
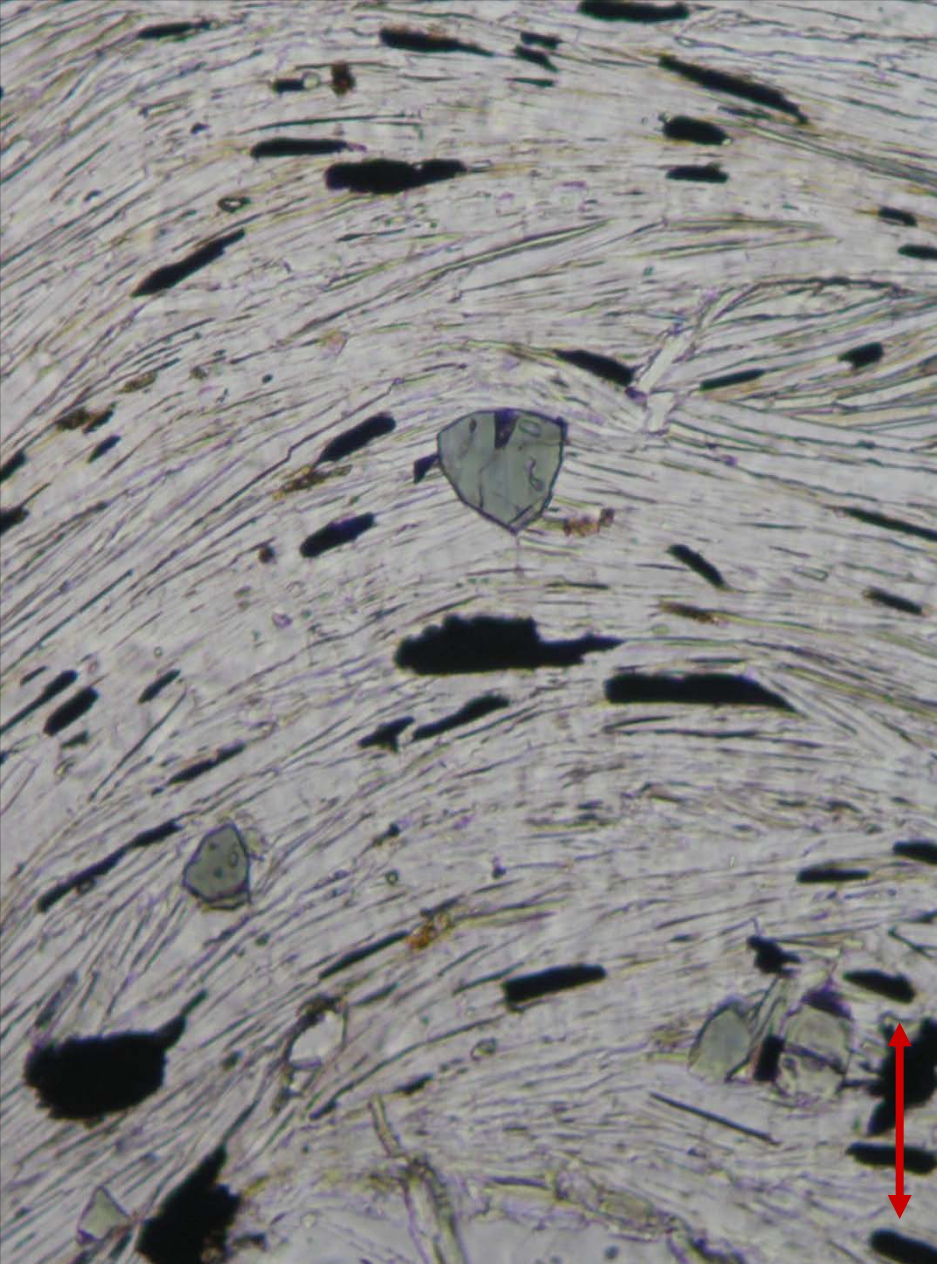
Tourmaline of the schorl-dravite series in a hydrothermal tourmaline-calcite vein from Chabičov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.7 mm. Photo: JiZi.



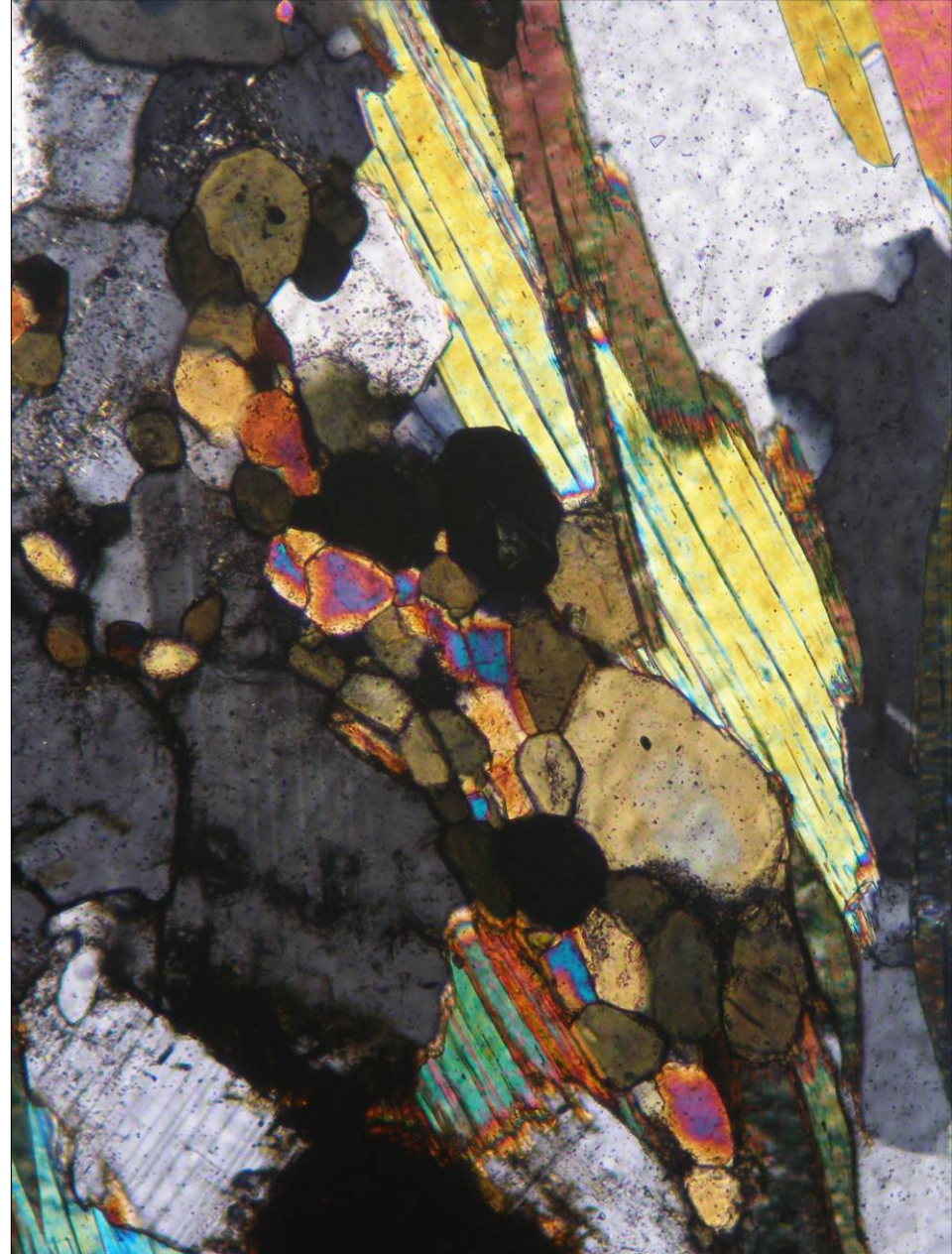
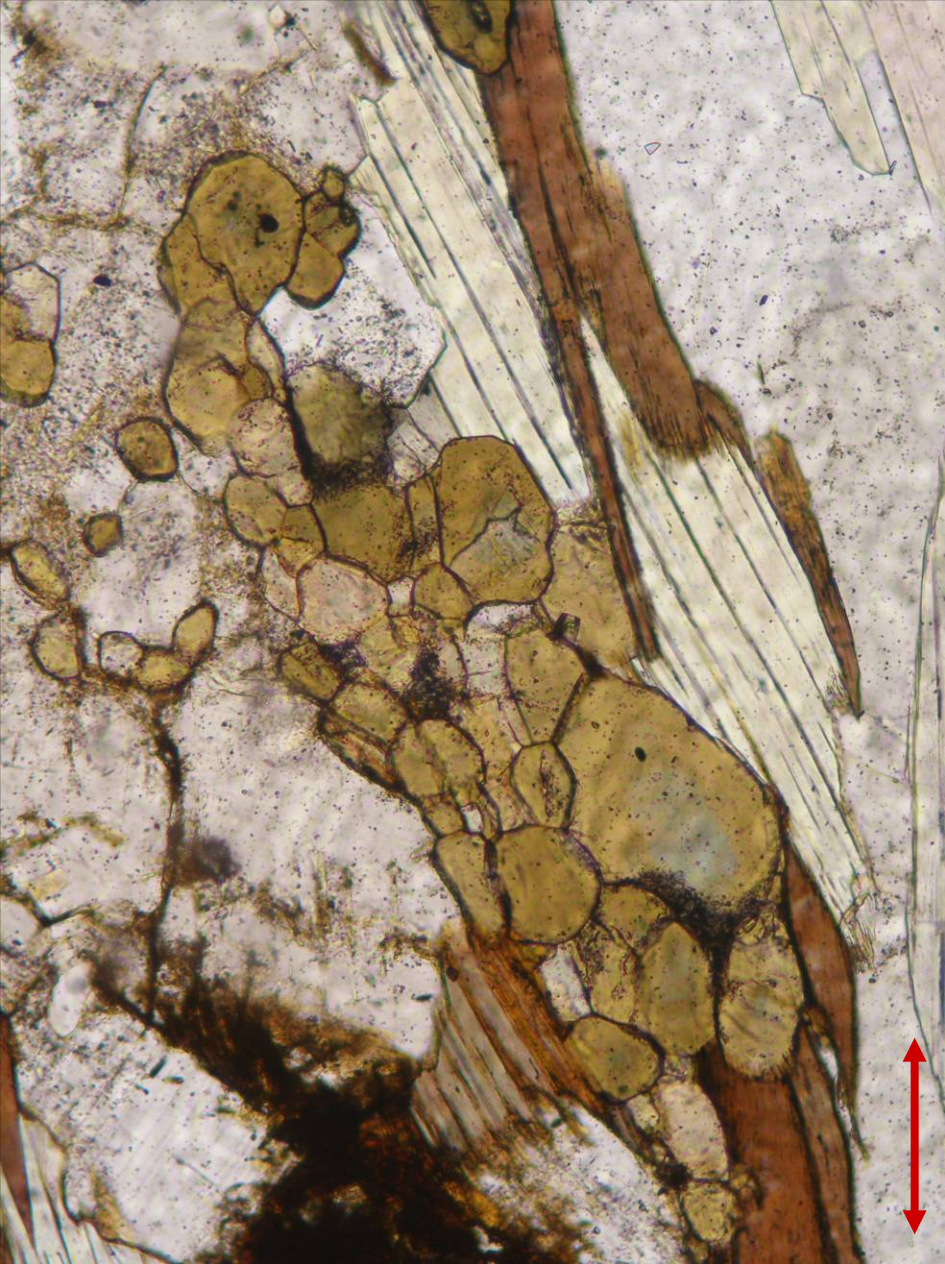
Plastic deformation of needles of tourmaline of the schorl-dravite series in a hydrothermal tourmaline-calcite vein from Chabičov, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 2.2 mm. Photo: JiZi.



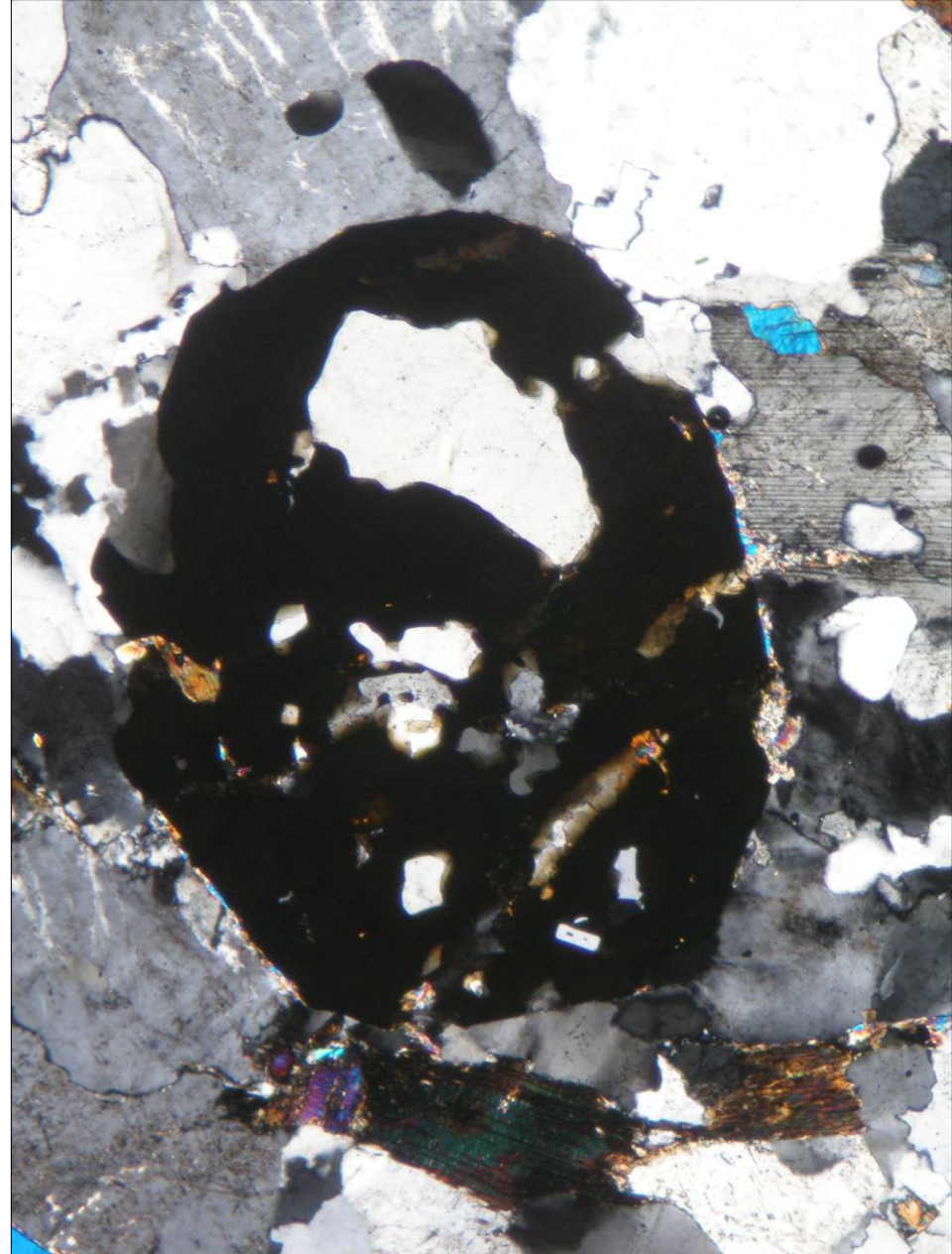
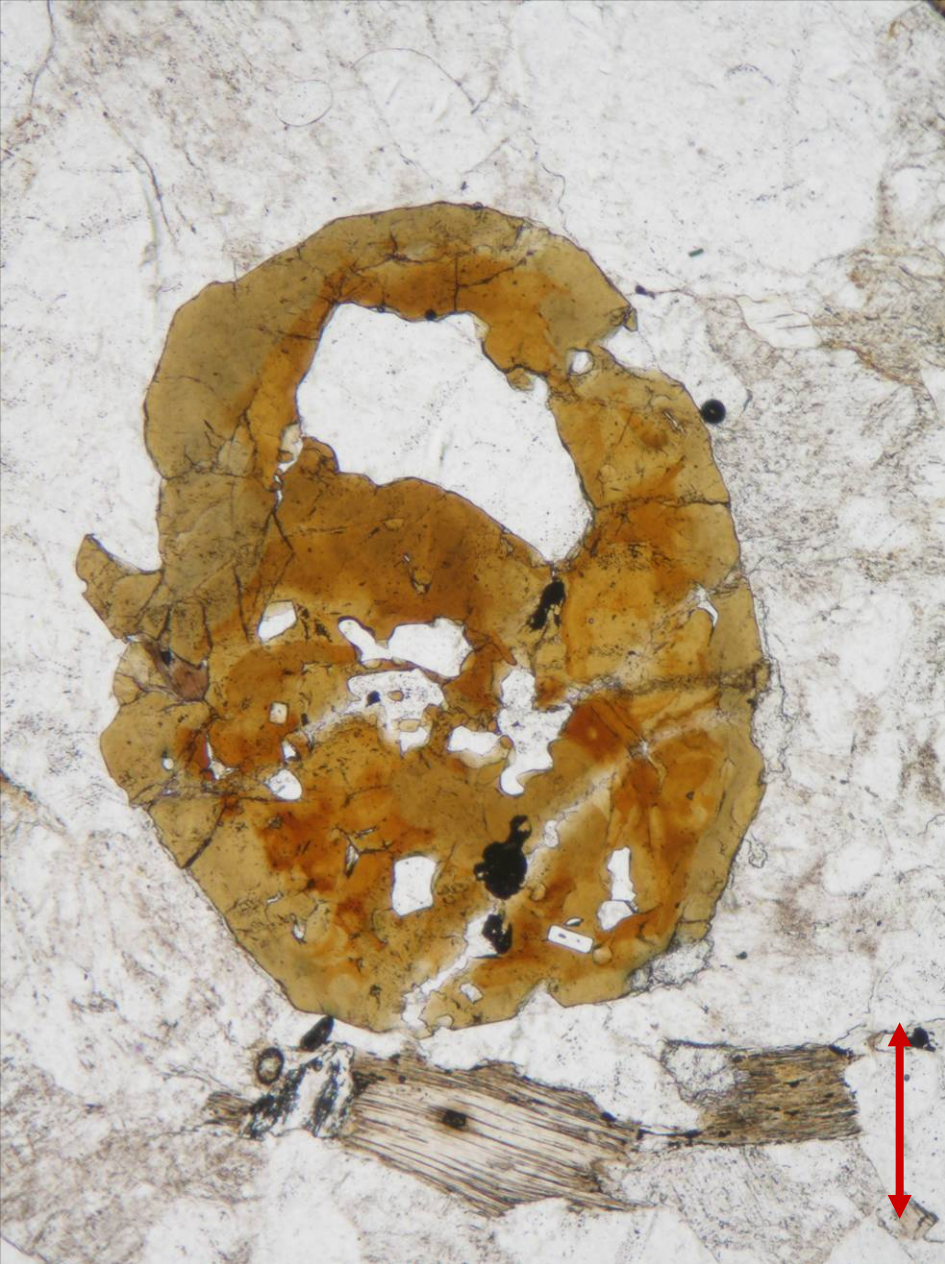
Strong pleochroism of tourmaline in mica schist from Markersdorf, Austria; PPL. Width of fields of view is ca. 0.3 mm. Photo: JiZi.



Tourmaline in mica schist from Markersdorf, Austria; PPL (left) and XPL (right). Width of fields of view is ca. 0.3 mm. Photo: JiZi.



Tourmaline, muscovite and biotite in mica schist from Kovářová, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 0.6 mm. Photo: JiZi.



Tourmaline in orthogneiss from Hluboká, the Czech Republic; PPL (left) and XPL (right). Width of fields of view is ca. 1.7 mm. Photo: JiZi.



Tourmaline in orthogneiss from Hluboká, the Czech Republic; PPL. Width of the field of view is ca. 1.8 mm. Photo: JiZi.



Strong pleochroism of tourmaline-schorl in quartzite from Petrov nad Desnou, the Czech Republic; PPL. Width of fields of view is ca. 0.8 mm. Photo: JiZi.