(Z)EN 12407:2007 (E)

ABC A HEAD PIOTR KRZEMINSKI „KONSULTING”

Petrographic analysis under transmitted light

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Magmatic rock chart

	Sample no	location	source	name	
IDENTYFIKACJA	1				

Description of sample

The provided sample is a rock slab measuring 20x20x3 cm. The rock has a gray to dark gray color with a light bluish tint (5B 7/1 Munsell Color Chart – 2009 – Light Bluish Gray). It is massive and compact, composed mainly of white feldspars – plagioclase – approximately 0.5 mm in size, and dark minerals, primarily pyroxenes and biotite of similar size, randomly distributed. There are no fractures or signs of weathering.

DESCRIPTION OF THE POLISHED SLAB

The sample was cut from the edge of the provided slab so as not to disturb its integrity. The light and dark minerals are randomly distributed, and the size of the mineral aggregates is similar to that described above.

MICROSCOPIC DESCRIPTION

The main component of the rock is feldspar belonging to the plagioclase group, which forms the groundmass. The plagioclases vary in size and structure. Crystals up to 0.3 mm are dominant and mostly show simple twinning (Carlsbad and albite). Occasionally, medium-sized plagioclase crystals (0.5–1 mm) appear, exhibiting banded zoning and hydrothermal alterations in the form of fine fractures in the crystal cores or small inclusions, probably pyroxenes. Only locally were very weak signs of sericitization and transformation of fine plagioclase fragments into muscovite observed. The plagioclases are mainly represented by anorthite and bytownite.

In addition, pyroxenes, biotite, quartz, and amphiboles have been identified. The rock shows strong alteration of amphiboles (green hornblende) into clinopyroxenes (more commonly augite) and, more rarely, orthopyroxenes (enstatite). Locally, pyroxenes occur in skeletal forms with characteristic twinning. Pyroxenes form crystals of various sizes, replacing amphiboles, ranging from 0.01 mm to 0.5 mm, and are randomly distributed throughout the rock.

Amphiboles are represented by hornblende, which is often replaced by pyroxenes and only rarely occurs in authigenic form, forming medium-sized, well-formed crystals up to 1 mm.

Biotite forms platy crystals ranging from 0.05 mm to 1 mm in size. Biotite crystals show cleavage along the 001 direction and are often replaced by chlorite, causing their color to change from brown to bluish-green or green. Chloritization is locally intense. Zircon inclusions with reaction rims (so-called “birth eye” structures) were observed in the biotite crystals.

Quartz occurs only sporadically and forms irregular, hypoauthigenic crystals (xenomorphic) filling the spaces between plagioclase crystals, with grain sizes up to 0.1 mm. Additionally, apatite was identified as small tabular inclusions within plagioclase and quartz.

Texture: massive and structureless

Composition

Main minerals: plagioclase, pyroxenes, amphiboles, biotite, quartz, apatite, zircons,

Essential minerals / Phenocrysts: plagioclase, pyroxenes, biotite
Accessory minerals / Matrix (cement): zircon, apatite
Porosity: None Degree: —

Alterations: chloritization – strong (affecting biotite); sericitization – weak (affecting plagioclase)

CLASIFICATION : GABBRO

The textural structure suggests that the rock could be classified as a diorite; however, the dominance of pyroxenes determines its classification as a fine-grained gabbro. Microscopic observations indicate that the rock has undergone secondary hydrothermal alteration.

Additional data :

Type (P)	PLUTONIC ALCALY	QAPF	Chemical assays No order	
		Modal Composition Plagioclase – 48 % Pyroxenes – 34% Biotite – 3% Amphiboles – up to 12% Quartz – up to 3%	CIPW	

Fig. 1. Example of microphotographs in thin section. A – Example of the pyroxene overgrow – skeletal texture; B – Example of pyroxene overgrow of amphiboles; C – The example of pyroxene intergrow with biotite; D – The examples of amphibole overgrown by pyroxene.

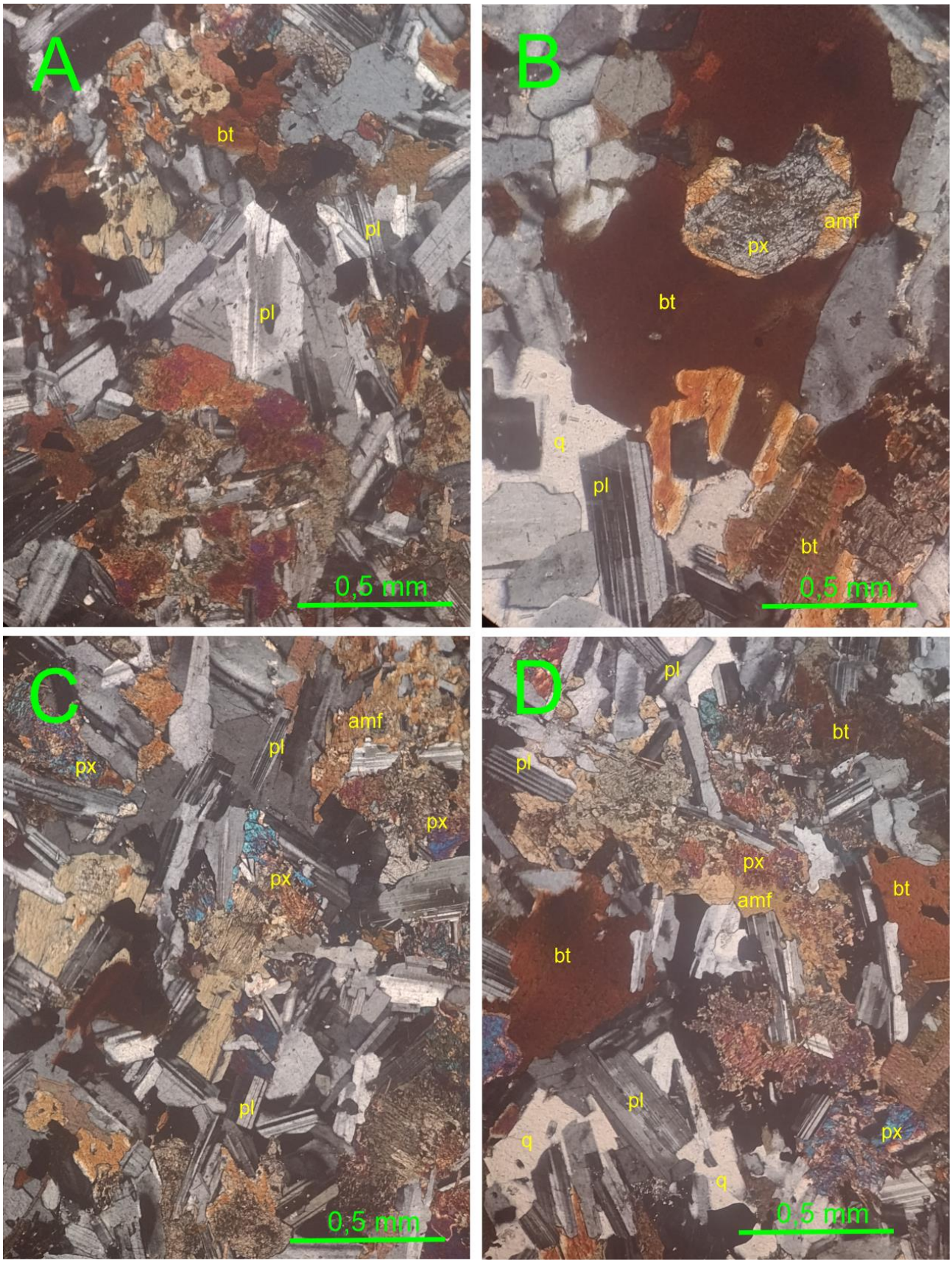

Fig. 2. Example of microphotographs in thin section. A - – Example of the pyroxene overgrow of amphiboles; B – Example of pyroxene (enstatite) overgrow of amphiboles; C – The example of pyroxene overgrown of amphiboles D – The examples of amphibole overgrown by pyroxene.

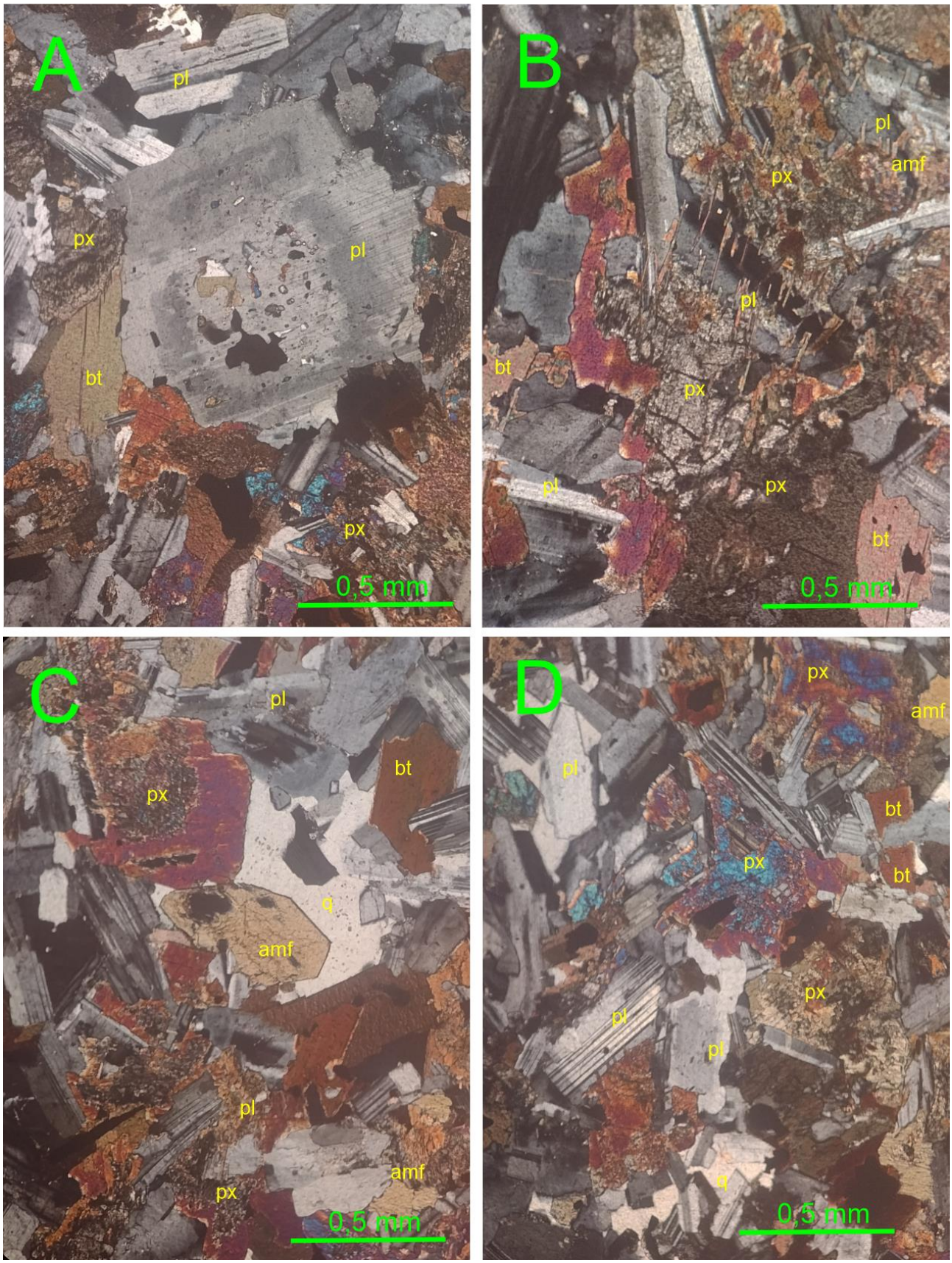

Fig. 3. Example of microphotographs in thin section. A - – Example of the zonal plagioclase; B – Example of the pyroxene overgrow – skeletal texture;; C – The example of pyroxene overgrown of amphiboles, in the centre the authigenic amphibole with quartz. D – The examples of amphibole overgrown by pyroxene.