DISCOVERY OF KYANITE FROM EPIDOTE-AMPHIBOLITE IN THE ŌEYAMA ULTRAMAFIC MASS, INNER ZONE OF SOUTHWEST JAPAN

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Kyanite is discovered from epidote-amphibolite in the Ōeyama (Kômorî) ultramafic mass. The Ōeyama ultramafic mass is situated along the northern side of the Maizuru tectonic zone, and belongs to type I ultramafic masses in this region (KUROKAWA, 1972). The mass comprises such rocks as dunite, peridotite, clinopyroxenite and gabbroic rocks. Clinopyroxenite body occupies the central part of the mass, and its volume

attains to 14.2% of the whole mass.

Kyanite-bearing epidote-amphibolite occurs as small lenticular bodies of about 50 cm in length in the clinopyroxenite body along the road at 1 km southwest from the Fukô pass.

Mineral assemblage of kyanite-bearing epidote-amphibolite is hastingsite, epidote and kyanite with a small amount of chlorite, sphene, rutile, pyrite and titanomagnetite. Hastingsite is dominant over epidote in modal composition.

Kyanite is identified by X-ray powder pattern, EPMA analysis and optical properties. Kyanite is colorless, but under the microscope, faint bluish pleochroism is sometimes recognized. Refractive indices are $\alpha_D = 1.716 \pm 0.002$, $\beta_D = 1.724 \pm 0.002$, $\gamma_D = 1.731 \pm 0.002$ and $(-)\ 2V = 82^\circ$. Kyanite often alters to sericite and other minerals not to be identified along its crystal margin and cleavages. Hastingsite is $\gamma_D = 1.680 \pm 0.002$

Fig. 1. Index map of the Ōeyama ultramafic mass

Fig. 2. Microphotograph of Kyanite
Ky : Kyanite H : Hastingsite

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Table 1. Bulk chemical composition of kyanite-bearing epidote-amphibolite.

SiO ₂	38.70	CaO	13.46
TiO ₂	0.78	MgO	6.48
Al ₂ O ₃	23.22	Na ₂ O	1.42
Fe ₂ O ₃	5.18	K ₂ O	0.35
FeO	6.90	H ₂ O ⁺	3.04
MnO	0.15	H ₂ O ⁻	0.13
		Total	99.81

(Anal. K. KUROKAWA)

and $(-)2V=81^{\circ}$, and axial colors are X=pale yellow, Y=green and Z=bluish green. Epidote is optically negative and $(-)2V=87^{\circ}$. Bulk chemical composition of the kyanite-bearing epidote-amphibolite is shown in Table 1. It is characterised by low SiO₂ and high Al₂O₃ content.

Electron microprobe analyses of kyanite and hastingite are made with JXA-5A micro-analyser at 15 KV and 0.02 μ A specimen current, and a electron beam being 4 μ in diameter on the specimen by the courtesy of Geological Survey of Japan. The results are shown in Table 2. Kyanite is fairly rich in iron and hastingite rich in Al₂O₃.

Kyanite in the river sands in the Ōeyama region is reported by URUNO and KURODA (1972). They noticed the intimate association of kyanite with staurolite.

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Table 2. Microprobe analyses of kyanite and hastingite and their atomic ratios

(1) Kyanite

SiO ₂	37.05	Si	4.069
TiO ₂	0.00	Al	7.831
Al ₂ O ₃	60.49	Fe	0.071
Fe ₂ O ₃	0.87	Mg	0.004
MnO	0.01	Na	0.004
CaO	0.00	(O=20)	
MgO	0.03		
Na ₂ O	0.02		
K ₂ O	0.00		
Total	98.47		

(Anal. Y. Koido)

(2) Hastingite

SiO ₂	40.98	Si	6.256
TiO ₂	0.49	Al ^{IV}	1.744
Al ₂ O ₃	15.04	Al ^{VI}	0.963
FeO	15.20	Ti	0.057
MnO	0.16	Fe	1.940
MgO	9.69	Mn	0.021
CaO	10.42	Mg	2.204
Na ₂ O	2.84	Ca	1.705
K ₂ O	0.23	Na	0.842
		K	0.044
		(O=23)	
Total	95.05		

(Anal. Y. Koido)

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