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Characterization of the constitution water of jadeite minerals in jadeitite from Burma

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ABSTRACT

This paper introduces the research status of constitution water in nominally anhydrous pyroxene group minerals, especially the FTIR characterization and constitution water content of jadeite. The jadeite minerals from Burma are observed in this thesis by adopting Micro-FTIR and Electron probe microanalysis (EPMA) to study the constitution water characterization of Burma jadeite minerals from the microcosmic angle. The research results show that the main constitution water characterization of jadeite minerals from Burma is manifested as absorption peaks with 3610~3620cm^{-1} and 3540~3550cm^{-1} areas in the infrared spectrum; the constitution water content of jadeite minerals in loose structure is more outside and less in the middle, and each part of constitution water content is homogeneous for jadeite of a compact structure. The content discrepancy and variation trend of constitution water are not affected by its chemical compositions but possibly resulted from the fluid involvement in jadeitite forming stage when plate is subducting and retracing, which further provides certain evidence to the origin of Burma jadeite.

KEYWORDS

Constitution water;
Jadeite;
Jadeitite;
Micro-FTIR.

INTRODUCTION

Recently a lot of researches show that traces of hydrogen exist in the nominally anhydrous mineral structures in the form of OH^- or H_2O, whose content ranges from several to several thousands×10^{-6}. These minerals are nominally called anhydrous and NAMs for short. Though the water content in this form is generally very low, it can change the physical and chemical properties of the minerals and the thermodynamic process of rocks. Plenty of researches show that constitution water is generally contained in the pyroxenes and the origin of rocks is explained in the determination and calculation of constitution water of pyroxene structure of rocks in different areas and types.

Places of origin for jadeitite deposits known in the world are quite few, and the only places that are found include the jadeitite zone (including Longkin and Tawmaw) in Parkhan northwest of Burma, Kotaki area and Oo sacho in Japan, San Benito of California America, Polar Urals and PayYer areas of Russia, Near Balkash north area of Kazakhstan and both sides of

Motagua crack in Guatemala. In them the jadeitite protogenesis of commercial mining value is mainly originated from Parkhan northwest of Burma. The major component mineral jadeite of Burma jadeitite $NaAl[Si_2O_6]$ is pyroxene group mineral whose general formula is $XY[Si_2O_6]$, where X (taking up M_2) includes Na^+, Ca^{2+}, Mn^{2+}, Fe^{2+}, Mg^{2+}, Li^+, Y (taking up M_1) includes Fe^{3+}, Cr^{3+}, Mn^{2+}, Fe^{2+}, Mg^{2+}, Al^{3+}, Ti^{4+}. In jadeitite the complex anions linked and constituted by the tetrahedron $[Si_2O_6]^{4-}$ $[SiO_4]^{4-}$ by sharing angular points extend infinitely along the direction of C axis, forming a single chain silica backbone. Among the chains, Al^{3+} at M_1 and Na^+ at M_2 are linked. Within the chain Si-O bond is mainly the covalent bond and outside the chain the positive ion (M_1, M_2) and the chemical bond of oxygen M_1/M_2-O are mainly ionic bonds. At present, that constitution water is contained in the jadeite mineral is a generally accepted viewpoint. However, so far the studies on existence form and combination mode of constitution water in the Burma jadeite minerals are quite scarce. With the Micro-FTIR, the author finds out the occurrence and content variation trend of constitution water in the jadeite mineral existing in Burma jadeitite so as to provide some evidence to the formation mechanism of Burma jadeitite.

RESEARCH STATUS OF CONSTITUTION WATER IN THE PYROXENE GROUP MINERAL

Fan Xiaoyu and Wu Xiuling et, al[2] have studied the water of jadeite in the ultrahigh pressure jadeite-quartzite of Dabie Mountain by using Nicolet 5700 type Fourier transform infrared spectrometer and the results indicate that constitution water in the form of OH^- is generally contained in the jadeite minerals. In FTIR three groups of absorption peaks namely 3430~3460 cm^{-1}, 3545~3575 cm^{-1}, 3610~3640 cm^{-1} occur and the average content of constitution water in jadeite is around 1000×10^{-6}. Besides, Xia Qunke[13,14,17] et al have measured a large amount of nominally anhydrous natural minerals and they consider that almost in all natural mantle minerals H is detected to occur in the form of OH^-. With the heterotherm FTIR, it is found that main OH^- peaks in monoclinic pyroxene, orthopyroxene and rutile move to low wave numbers as the temperature rises, which explains that temperature variation influences the constitution water. Wang Rong, Zhang Baomin et, al[16] have made FTIR analysis on the Iherzolite inclusion in Gunagdong Yingfeng Ridge, Xuwen Zhangtao Village, Hainan Wenchang Fuji Field and Fujian forest land in South China areas. The results show that all the pyroxenes in the inclusion contain constitution water and all constitution water exists in the form of OH^-. By contrasting the monoclinic pyroxene and orthopyroxene in different areas it is discovered that they are heterogeneous crosswise in a large scale and a conclusion is drawn that the pyroxene is the important “water reservoir” in upper mantle of south China and that the constitution water content in upper mantle is heterogeneous crosswise in a large scale.

The geotectonic location where the Burma jedeitite mining area is located is at the subduction zone formed by mutual collision of Eurasian and Indian Plates. The fluid activity is the important controlling factor of metamorphism, magmatism and mineralization. Besides, the fluid effect in the plate folding back process causes the jadeitite to be metamorphic, which is an important phenomena deserving attention while the origin, type and scale of flow of retrograde metamorphism have always been the key point of debate and research. Recently scholars have raised some different viewpoints on its genesis with a lot of researches. Cui Wenyuan, Shi Guanghai et al[1] raise a new magmatic origin hypothesis and think that the magma forming emerald is equivalent to the hydrous jadeitic silicate molten mass that possibly originates from mantle with the crystal pressure minimum being p>1. 5GPa and temperature range from 650~800!. It is different from the magmatic origin theory that emerald is formed by desilicication of granitic magma. Shi Guanghai et al[11] has applied SHRIMP technique to identify zircons of three groups with different ages. Zircon of the first group contains inclusion without Na rich in Mg and is possessed with typical growing annule. Its $^{206}Pb/^{238}U$ age is (163.2±3.3) Ma, considered as ultrabasic rocks closely related to jadeite or serpentinized formation age. That of the second group mainly grows around the first group, not possessed with distinct growing annule and containing jadeite pyroxene inclusion. Its $^{206}Pb/^{238}U$ age is (146.5±3.4) Ma that is the metamorphic age of jadeitite, namely the formation age of Burma jadeitite. Zircon of

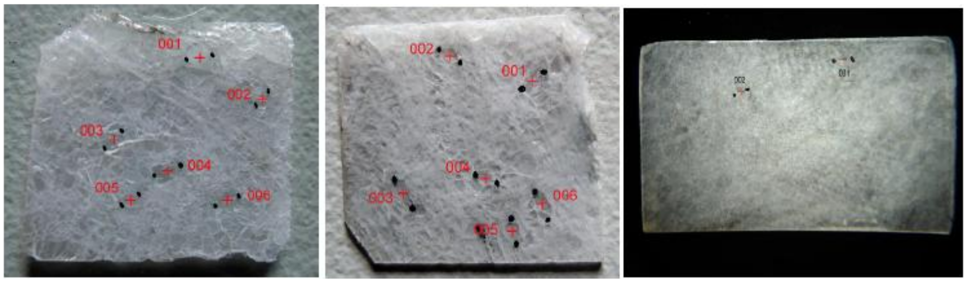

Figure 1 : Experimental samples (From left to right: LJ-44-1, LJ-44-2,SJ-6-1.The numbers in the Figure are jadeite monomineral grains selected.)

the third group grows by cutting through the former two groups. Its $^{206}Pb/^{238}U$ age given by single-point analysis is (122.2±4.8) Ma, representative of one heat decay after formation of jadeitite. Qiu Zhili et al[10] think that the emerald body of Burma gem level is formed at the late Jurassic Period with the age of (158+2) Ma while the collision of Indian Plate and Asian Plate occurred at about 55Ma, which basically defined that the formation of emerald has nothing to do with the plate collision. Besides, with the nervation and attitude of jadeitite, as well as the characteristics of zircon light rare earth (LREE) loss and heavy rare earth (HREE) enrichment, it can be deduced that emerald is the hydrothermal metasomatism product when fluid is existent and related to the dehydrated fluid in the ocean plate subducting process. G. E. HARLOW etc.[4] also think that jadeitite hosts in the serpentinite primarily as antigorite and draw a conclusion that almost all the jadeitites are formed in the effective subduction and collision process through the interaction by serpentinized olivinite and Na Al Si fluid in the high temperature and high pressure environment based on the jadeitite structure and cathode luminescence test results.

At the same time, more researchers have realized that the formation of emerald is multistage[12] and they think that emerald has undergone complex formation and evolutionary processes which are mainly two stages: the formation stage (diagenesis) of jadeitite and transform stage (including jade forming and amphibolization) and plastic deformation. Therefore, apart from the formation stage of jadeitite, the later jade forming stage is very important. It is generally believed that the transform of dynamic metamorphism in later period plays a vital function which converts the jadeitite into jade so as to make emerald different from ordinary jadeitite. To sum up, regardless of which theory of genesis, the fluid is involved. So to observe the coupling relationship between constitution water in jadeite of Burma jadeite, crystal rhythm annule and symplektite from the mircroscale helps us to provide an important basis for the revelation of origin and evolutionary mechanism of Burma emerald.

EXPERIMENT AND TEST METHODS

Two blocks of lavender jadeitite with a coarse grained texture and one of fine grained texture from Burma are taken as the experimental subjects and cut into polished sections of 0.03mm (LJ-44-1), 0.02cm (LJ-44-2)and 0.055cm (SJ-6-1)(Figure 1). The polished sections are observed with polarizing microscope and gem microscope and contrasted. They are rinsed with absolute ethyal alcohol and placed into the dryer oven below 100°C for over 5h to ensure that no free water is on the sample surface and within fissure. Single grain kept intact without crush and recrystallized jadeite mineral are selected from the polished sections for micro-FTIR line scanning.

BRUKER LUMOS stand-alone type infrared microscope is used to observe the characterization of jadeite constitution water. Test condition is non-polarized light with the transmission method used. Wave number range is 4000~2500cm^{-1} and 32 scan times. The resolution ratio is 4cm^{-1}. Each test point size is 100¼m×100¼m as LJ-44-1and LJ-44-2 line scanned. Each test point size is 5¼m×5¼m as SJ-6-1 line scanned. OPUS 7.2 software is used for spectrum collection and atlas treatment. Each curve is to be properly baseline corrected and matched. According to Lambert-Beer law c=^{3}%/Iγ* d the constitution water content of jadeite grain is calculated, where c is the constitution water content ×10^{-6}, ^{3}% is the integrated

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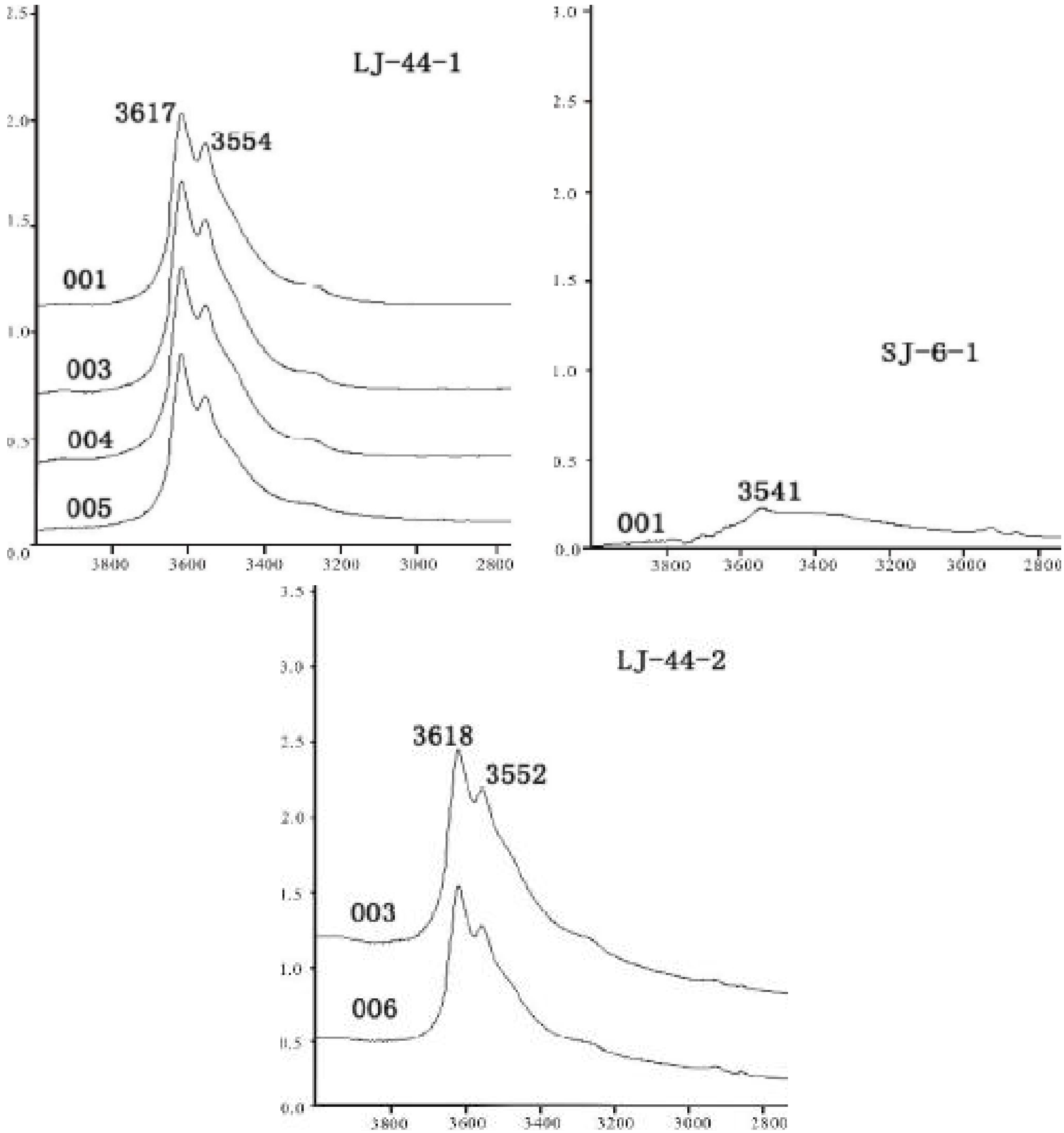

Figure 2 : Characterization of micro-infrared reflection spectrum of jadeitite from Burma (4000~2000cm^{-1} reflection method)

absorption area cm^{-2}, I is the ratio of integral and absorption coefficient ($7.09\times10^{-6}\bullet cm^2)^{-1}$. γ is the direction factor, to be 1/3 for heterogeneous jadeite and d is the polished section thickness (cm)[1]. JXA-8800R electronic probe is used for jadeite component test and the test condition is resolution ratio 6nm (30kV).

TEST RESULTS AND ANALYSIS

Characterization of micro-FTIR

The tested wave number range is 4000~2500cm^{-1}. Constitution water is generally contained in the jadeite mineral. The absorption peak of OH^- has certain discrepancy in emerald of different structures. The absorption peak of OH^- in jadeite is roughly displayed as 3617cm^{-1} and 3552cm^{-1} as line scanned in the jadeitite with a coarse structure while that of OH^- as 3621cm^{-1},

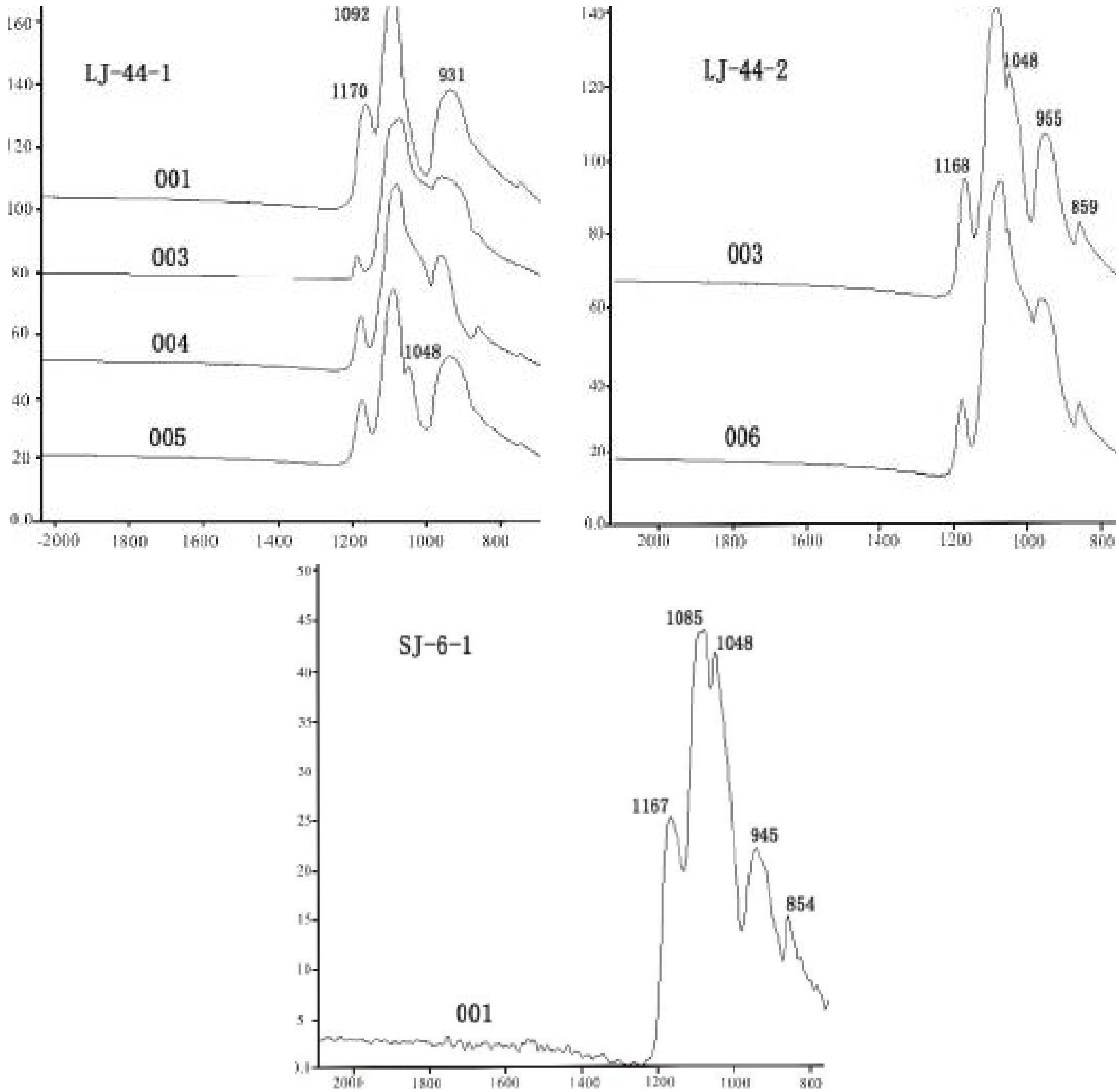

Figure 3 : Characterization of micro-infrared reflection spectrum of jadeitite from Burma (1700~700cm^{-1} reflection method)

TABLE 1 : Analysis of micro-infrared reflection spectrum of jadeitite from Burma (cm^{-1})

Sample No	Grain No	M-OH stretching vibration (cm^{-1})	Antisymmetric stretching vibration of O-Si-O and Si-O-Si and symmetrical stretching vibration of O-Si-O
LJ-44-1	001	3617,3554	1164,1090,950
	003	3617,3552	1186,1072,965
	004	3621,3552	1175,1079,965
	005	3621,3555	1175,1091,1049,957
LJ-44-2	003	3610,3552	1171,1083,1048,956
	006	3617,3555	1171,1130,1079,1049,953
SJ-6-1	001	3541	1165,1080,1047,941

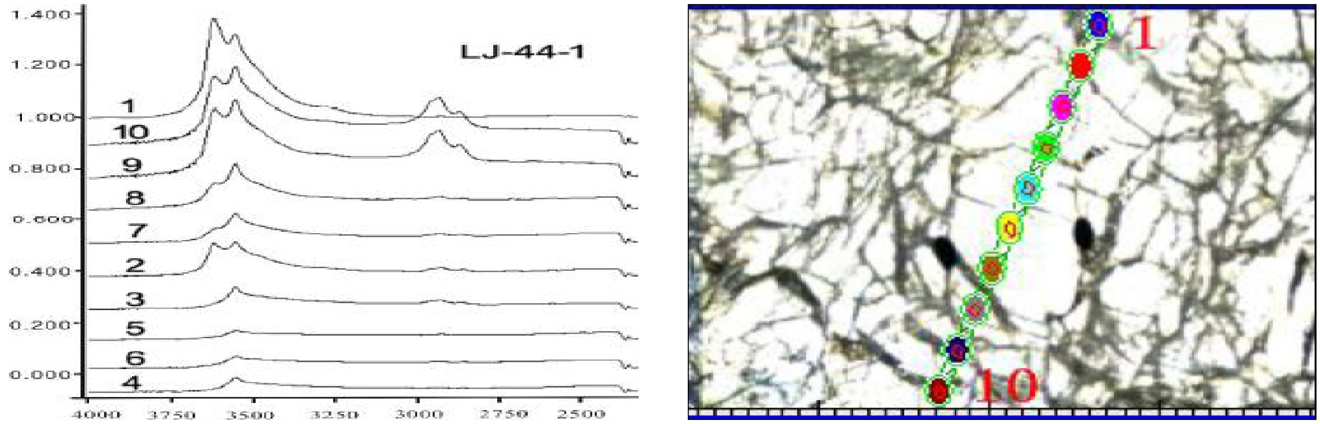

Figure 4 : Characterization of line scanning micro-infrared transmission spectrum of jadeitite from Burma (LJ-44-1, Grains 001)

TABLE 2 : Calculation of constitution water content of jadeitite from Burma (LJ-44-1, Grains 001)

Sample No	Grain No	Sample thickness d cm	PT	Absorption peak cm^{-1}	Relative intensity A%	Width cm^{-1}	Integral area Δcm^{-1}	Water content $C*10^{-6}$	Total water content$*10^{-6}$	Residual
				3617	0.86	48.51	65.69	1391.74		
			1	3552	0.61	82.09	78.98	1673.31	5079.24	0.020
				3469	0.33	183.21	95.07	2014.19		
				3617	0.10	42.69	6.44	136.44		
			2	3553	0.09	72.43	10.74	227.54	597.03	0.003
				3470	0.05	134.93	11.00	233.05		
			3	3551	0.05	46.79	3.67	77.75	596.18	0.006
				3448	0.04	350.01	24.47	518.43		
			4	3553	0.04	53.98	3.51	74.36	172.88	0.001
				3480	0.02	129.62	4.65	98.52		
			5	3543	0.03	92.00	3.64	77.12	77.12	0.002
			6	3552	0.03	70.72	3.49	73.94	182.84	0.0009
				3473	0.02	156.12	5.14	108.90		
LJ-44-1	001	0.02		3620	0.02	32.38	1.12	23.73		
			7	3550	0.09	69.76	9.57	202.75	617.79	0.004
				3433	0.05	248.63	19.59	415.04		
				3621	0.05	40.44	3.23	78.4		
			8	3551	0.12	69.16	12.88	272.88	883.26	0.005
				3448	0.07	259.26	28.81	610.38		
				3629	0.10	34.66	5.17	109.53		
			9	3609	0.13	44.88	9.24	195.76	1376.90	0.004
				3553	0.20	69.42	21.90	463.98		
				3477	0.12	148.75	28.68	607.63		
				3617	0.19	46.96	13.84	293.22		
			10	3553	0.20	72.68	23.12	489.83	1380.30	0.006
				3469	0.11	156.13	28.19	597.25		

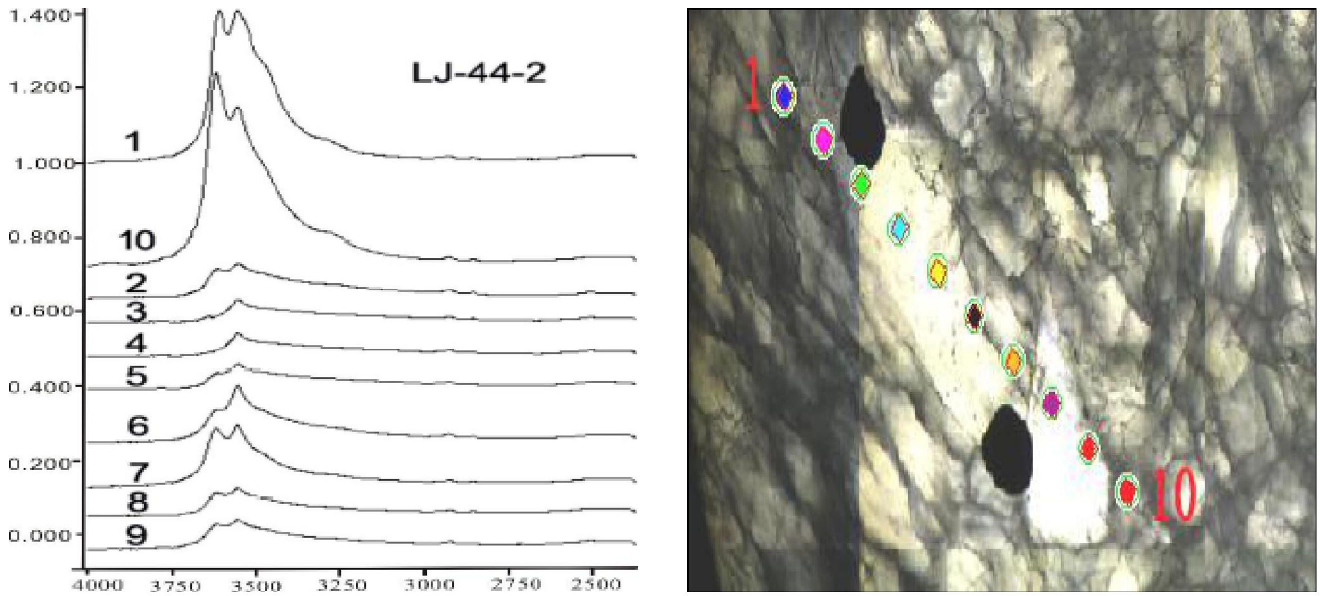

Figure 5 : Characterization of line scanning micro-infrared transmission spectrum of jadeitite from Burma (LJ-44-2, Grain 003)

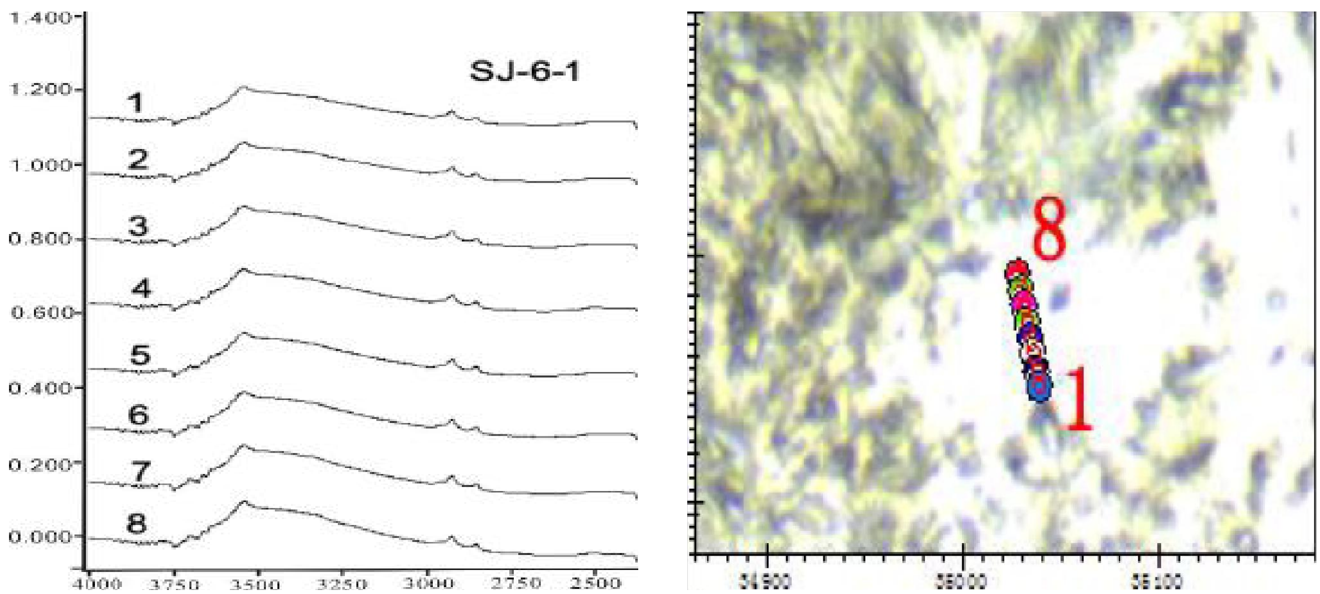

Figure 6 : Characterization of line scanning micro-infrared transmission spectrum of jadeitite from Burma (SJ-6-1, Grain 001)

3539cm^{-1}, 3467cm^{-1}, 3394cm^{-1} and 3326cm^{-1} approximately as area scanned. The absorption peak of OH^- of jadeite in jadeitite of a fine grained texture as line scanned is about 3541cm^{-1} (Figure 2 and TABLE 1). The infrared absorption spectrum of the same jadeite grain is measured with reflection method, and the test wave number is 2000~700cm^{-1}. According to data display[6,7], the absorption peak of jadeite is mainly manifested as 3 frequency bands of 900cm^{-1}^ÿ1200cm^{-1}, namely as 1162cm^{-1}, 1079cm^{-1} and 950cm^{-1}, in which the band of 1079cm^{-1} is the strongest. The test result display is all identical to the standard graph of jadeite mineral (Figure 3 and TABLE 1), indicating that the selected grains are all pure jadeite.

In conjunction with OPUS7.2 software and Lambert-Beer laws, the constitution water content of jadeite mineral in Burma jadeitite is calculated and the constitution water content of different parts on the same grain is gained by contrasting line scanning spectrum. Results indicate that a. inequal amount of constitution water is found in each jadeite grain; b. distinct nonuniformity exists with the constitution water content

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TABLE 3 : Calculation of constitution water content of jadeitite from Burma (LJ-44-2, Grains 003)

Sample No	Grain No	Sample thickness d (cm)	PT	Absorptionpeak cm-1	Relativeintensity A%	Width cm^{-1}	Integral area $\triangle cm^{-1}$	Water content C*10-6	Total water content $*10^{-6}$	Residual
				3621	0.17	30.87	8.21	115.96		
				3603	0.21	37.34	12.17	171.89		
			1	3560	0.20	52.09	16.02	226.27	1392.93	0.008
				3529	0.15	62.83	14.68	207.34		
				3470	0.20	153.57	47.54	671.47		
				3633	0.02	23.01	0.73	10.31		
			2	3611	0.04	35.69	2.13	30.08	443.78	0.004
				3546	0.07	103.14	10.80	152.54		
				3411	0.05	238.87	17.76	250.85		
				3640	0.01	19.96	0.28	3.95		
			3	3553	0.05	67.20	5.52	77.97	107.34	0.000
				3469	0.02	66.89	1.80	25.42		
			4	3548	0.04	62.00	4.32	61.02	274.01	0.004
				3415	0.03	297.00	15.08	212.99		
				3616	0.03	31.79	1.00	14.12		
			5	3552	0.05	66.63	5.05	71.33	160.03	0.002
				3474	0.03	119.83	5.28	74.58		
LJ-44-2	003	0.03		3620	0.06	60.45	5.36	75.71		
			6	3553	0.11	56.27	9.29	131.21	375.56	0.002
				3484	0.06	132.74	11.94	168.64		
				3627	0.08	50.58	6.58	92.94		
			7	3607	0.05	51.48	4.42	62.43	484.18	0.002
				3553	0.10	57.2	9.35	132.06		
				3490	0.06	140.48	13.93	196.75		
				3625	0.03	38.85	1.95	27.54		
			8	3603	0.02	42.43	1.50	21.19	214.69	0.001
				3552	0.05	67.39	5.38	75.99		
				3478	0.03	126.11	6.37	89.97		
				3634	0.02	41.05	1.35	19.07		
			9	3611	0.03	48.31	2.40	33.90	244.49	0.003
				3553	0.05	76.03	6.04	85.31		
				3475	0.03	140.00	7.52	106.21		
				3618	0.41	53.56	34.83	491.95		
			10	3553	0.29	83.11	37.64	531.64	1485.17	0.010
				3477	0.18	118.81	32.68	461.58		

within the same jadeite mineral. Maximum water content in Sample LJ-44-1 Grain 001 reaches up to 5079.24×10^{-6} and the minimum is only 77.12×10^{-6} (Figure 4, TABLE 2); the maximum water content in Sample

TABLE 4 : Calculation of constitution water content of jadeite mineral from Burma (SJ-6-1, Grains 001)

Sample No.	Grain No.	Sample thickness d cm	PT	Absorption peak cm^{-1}	Relativeintensity A%	Width cm^{-1}	Integral area $\triangle cm^{-1}$	Water content C $*10^{-6}$	Total water content $*10^{-6}$	Residual
SJ-6-1	001	0.055	1	3547	0.07	127.31	13.95	107.47	207.01	0.004
				3442	0.04	192.75	12.92	99.54		
			2	3547	0.07	132.35	15.31	117.95	224.11	0.040
				3438	0.05	191.04	13.78	106.16		
			3	3547	0.08	135.83	16.31	125.65	237.98	0.004
				3435	0.05	189.70	14.58	112.33		
			4	3546	0.08	142.34	17.86	137.60	242.84	0.004
				3433	0.05	183.68	13.66	105.24		
			5	3546	0.08	143.84	19.04	146.69	221.34	0.004
				3437	0.04	153.81	9.69	74.65		
			6	3546	0.09	149.69	20.51	158.01	274.27	0.004
				3430	0.05	182.17	15.09	116.26		
			7	3546	0.09	152.89	21.92	168.87	286.28	0.004
				3429	0.05	177.65	15.24	117.41		
			8	3543	0.11	163.42	27.17	209.32	232.36	0.005
				3453	0.02	83.71	2.99	23.04		

LJ-44-2 Grain 003 is 1392.93×10^{-6} and lowest is only 107.34×10^{-6} (Figure 5, TABLE 3); the maximum water content in Sample SJ-6-1 Grain 001 is 286.28×10^{-6} and lowest 207.01×10^{-6} (Figure 6, TABLE 4).

Besides, by contrasting the constitution water content in different parts of the same jadeite grain as line scanned, it is discovered that the constitution water of jadeite mineral grain is obviously heterogenous, that the jadeite water content of jadeitite with a loose structure is small in the middle and large outside apparently while the water content is generally low of with no apparent variation trend in jadeitite with a compact structure. The constitution water content of the same grain is quite uniform. At PT1 and 10 the constitution water contents for Sample LJ-44-1 Grain 001 are 5079.24×10^{-6} and 1380.3×10^{-6}, water content at PT 5 is 77.12×10^{-6}; data for Sample LJ-44-2 Grain 003 at PT 5 and 10 are 1392.93×10^{-6} and 1485.17×10^{-6} and that at PT5 is 160.03×10^{-6}. Water contents for Sample SJ-6-1 Grain 001 at PT 1 and 8 are 207.01×10^{-6} and 232.36×10^{-6} and data for PT 4 and 5 are 242.84×10^{-6} and 221.34×10^{-6}.

Chemical composition analysis

EPMA analysis result shows that chemical composition of the selected jadeite grain is quite pure. Major elements of the samples include Na, Al, Si and O. The average values of element mass percent (in TABLE 5) are about 10.94%, 15.52%, 31.61% and 33.46%, and those of element quantity percent (in TABLE 6) are about 9.65%, 11.67%, 22.76% and 42.5%. The ratio of atomicity basically meets 1: 1: 2: 5 with a comparison made against the previous research results[6]. Thus it can be seen that all grains tested are pure jadeite minerals with a not very evident component difference. The change of constitution water content is of little connection to its composition.

DISCUSSION

Plenty of researches indicate that the formation of Burma jadeitite generally falls into two stages of diagenesis and jade formation. In diagenetic stage, protogenesis jadeitite is directly formed by crystallization of jadeitite flux/hydrotherm in a relatively static environment. In the jade forming stage, jadeitite assumes to be a deformed and metamorphic structure due to deformation and metamorphism, resulting the structure change of jadeitite

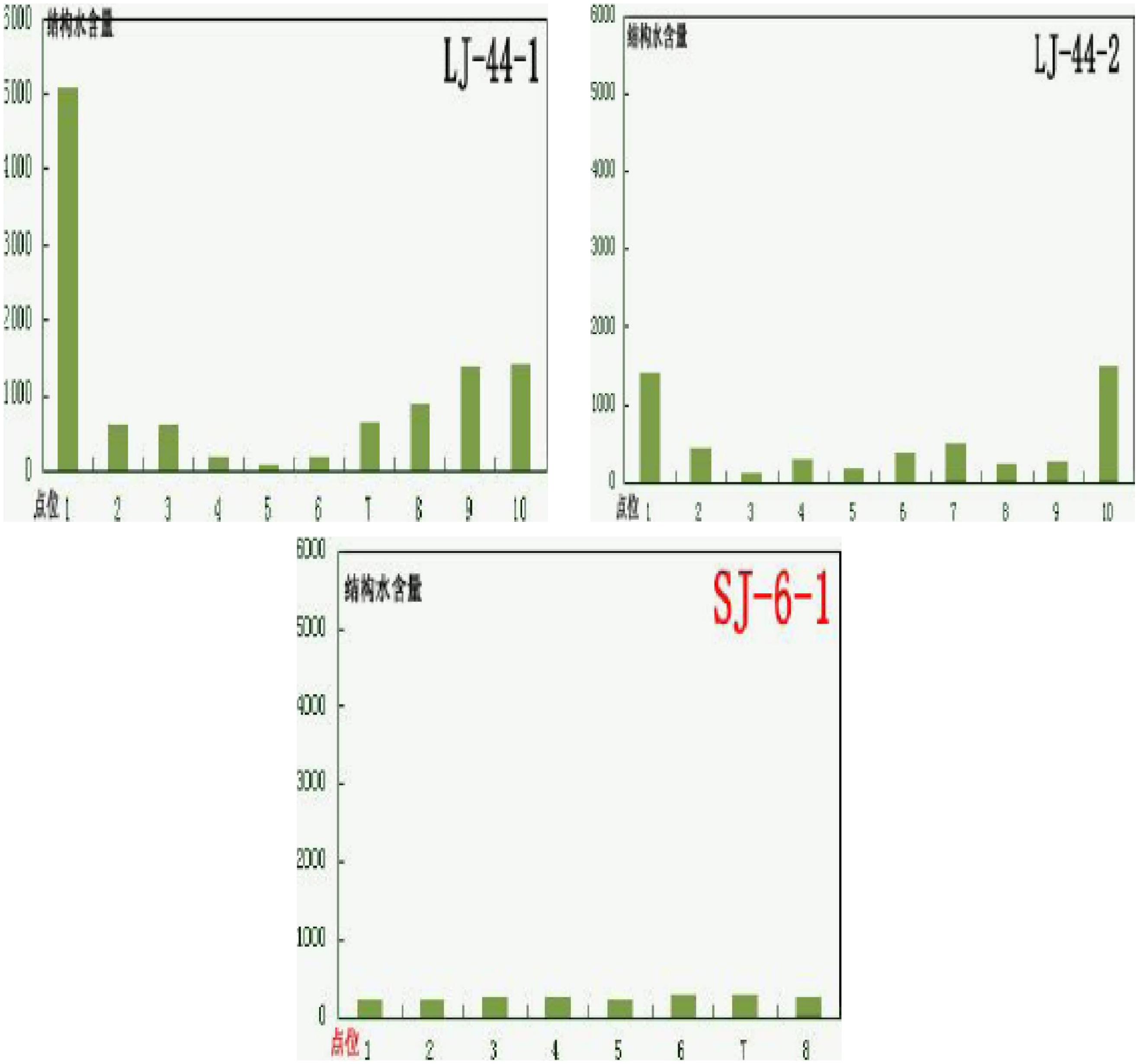

Figure 7 : Histogram characterization of constitution water content of the same jadeite grain from Burma

TABLE 5 : Chemical composition analysis of jadeite minerals in Samples (The element mass percentage, Wt%)

Sample No.	Grain No.	Na	Mg	Al	Si	K	Ca	O	C	Total
LJ-44-1	001	10.86	0.15	15.43	31.15	0.08	0.27	33.75	8.30	99.99
LJ-44-2	003	11.54	0.00	16.12	32.74	0.00	0.00	34.16	5.44	100
SJ-6-1	001	10.41	0.32	15.00	30.94	0.66	0.52	32.47	9.68	100

and migration concentration of some elements causing color. This is critical to the formation of jadeitite[12]. In diagenetic stage, protogenesis jadeitite is directly formed by crystallization of jadeitite flux/hydrotherm in a relatively static environment. In the jade forming stage, jadeitite assumes to be a deformed and metamorphic structure due to deformation and metamorphism, resulting the structure change of jadeitite and migration concentration of some elements causing color. This is critical to the formation of jadeitite[12]. With the measuring results of constitution water content, it is discovered that water content of jadeite grain in jadeitite of a

TABLE 6 : Chemical composition analysis of jadeite minerals in Samples (The element quantity percentage, At %)

Sample No.	Grain No.	Na	Mg	Al	Si	K	Ca	O	C	Total
LJ-44-1	001	9.51	0.12	11.51	22.31	0.04	0.14	42.45	13.91	99.99
LJ-44-2	003	10.37	0.15	12.36	23.89	0.00	0.14	44.37	8.72	100.00
SJ-6-1	001	9.08	0.27	11.14	22.08	0.34	0.26	40.68	16.15	100.00

loose structure is obviously more than that of the grain in jadeitite of a compact structure. This phenomon explains the forming stage of Burma jadeitite. Primary deposit of Burma jadeitite is generally located on the plate subduction and collision zone, and the overall formation process of jadeitite is related to the subduction and retracing of continental plate to ocean plate. In the plate subducting course, the alterated oceanic crust basalt and its overlying deposit are able to give off a mass of water-rich fluid with the rise of temperature and pressure of subduction zone. As the subducting rate is very fast, a small number of aqueous fluid goes into the nominally anhydrous mineral (such as jadeite), and this stage is the diagenetic stage of emerald. Immediately, continental plate retraces. As the pressure suddenly lowers, all minerals containing water (H_2O and OH^-) will be decomposed or hydroxy melted. Therefore, hydroxyl is an important fluid catalyst in the retrograde metamorphism and makes up an important source of retrograde metamorphism plus the preexisted fluid inclusion and fluid containing hydroxyl mineral[19]. Characterization of constitution water content of jadeite mineral in jadeitite of different structures has verified the stage formation theory of jadeitite that has provided some evidence to the fact that jadeite mineral contains constitution water.

Besides, research shows that regular heterogeneity exists with constitution water content of the jadeite mineral in jadeitite. The author deduces that it has something to do with the decomposition or melting of H^+ in the plate retracing process. In the course of plate retracing process, namely the jade forming stage of jadeitite, the sudden reduction of pressure makes H^+ melt inside out in mineral grains, which causes the constitution water content in jadeitite of a loose structure to be little in the center and much outside. After the pressure is stabilized, H^+ melting is finished, showing that the constitution water content of jadeite grains in jadeitite of a compact structure is quite uniform, which explains that constitution water is equilibratory in samples and not transformed by the fluid activity in later period.

CONCLUSION

To sum up, with the Burma jadeitite as research subject, micro-FTIR is applied to test the constitution water content and variation trend of jadeite minerals in jadeitite in this paper and the conclusions are drawn as follow:

1) Constitution water is generally contained in the jadeite of Burma jadeitite and its main characteristic in FTIR is spectral peak in the two regions of 3610~3620cm^{-1} and 3540~3550cm^{-1}.

2) The constitution water content in jadeitite minerals with different structures is of very distinct diversity and the variation of constitution water content has certain regularity. Constitution water content in jadeitite minerals of a loose structure is much in both sides and little in the middle while that of a compact structure is quite uniform in each part;

3) The content discrepancy and variation trend of constitution water in Burma jadeitite is not related to its chemical component. Its characteristic of constitution water is probably the result of fluid involvement in the diagenesis and jade forming stage and plate subducting and retracing course.

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