GEOCHEMISTRY OF MUONG-NONG TYPE TEKTITES II: LITHIUM, BERYLLIUM, AND BORON. C.Koeberl[1], R.Berner[2] and F.Kluger.[1]
(1) Institute for Analytical Chemistry, Univ. Vienna, P.O. Box 73, A-1094 Vienna, Austria (2) Research Institute for Chemistry, HBLVA XVII, A-1170 Vienna, Austria.

1. Introduction

This is the second in series of papers (1,2) reporting first results from a multi-element analysis program intended to include data for about 40 elements in 19 samples of Muong-Nong type tektites recovered from Ubon Ratchathani, East Thailand. For a very short description of the unusual properties of Muong-Nong type tektites compared to splash-form tektites and for some references see (1), and upcoming papers.

One important property of Muong-Nong type tektites is their enrichment in volatile elements. In that sense it seems important to put up an as-complete-as-possible data set of chemical data to check for systematics and genetic effects. The lighter elements in the second period of the periodic table of the elements are only rarely determined, in spite of some analytical problems. We report here a complete set of Li and Be data for all 19 samples, as well as some preliminary boron data.

2. Analytical Methods

Li: The method used for the determination of lithium in tektites has been described by Koeberl and Berner (3) and was checked against a RINAA method using ß-counting of the Li-8 decay (T/2=0.844 sec) (4,5).

Be: Only very few Be data are available for tektites in general, and none for Muong-Nong type tektites. Of the few analyses available almost all have relied on emission spectrography (6,7). A method for the determination of Be in geological samples has been developed (Berner, in preparation) and was applied with modifications to the analysis of tektites. Basically, the method involves (after some chemical treatment) computer optimized graphite furnace atomic absorption spectrometry. The reproducibility and the error of the method is (at present) about ±15%. All numbers reported in table 1 are averages of 3-4 determinations.

B: Some B data in tektites have been reported (6,8), all involving emission spectrography. Our method (to be decribed in detail in later paper) involves some chemical preparation and subsequent ion sensitive electrode measurement of the fluoroborate ion (for details on the chemical treatment as well as for a large data set on the influence of ambient conditions see Kluger et al., 1984, in preparation). Here we report some preliminary results from this method, and other data obtained by ICP analysis (Perkin Elmer ICP 6000 system).

The results for all elements are summarized in table 1.

3. Discussion

The importance of Li data in tektite research has already been discussed by the authors (3,5) and in the literature (8). Li in our Muong-Nong samples varies between 26.5 ppm and 57.5 ppm with an average of 42.1±7.4 ppm (standard deviation, 19 samples). This is about the same range than in normal splash-form tektites.

Shukla and Goel (8) quote a single value for a Muong-Nong type tektite with about 60 ppm Li, which is at the upper limit of our range. Since Li is a non-volatile element there is no fractionation or enrichment expected and found. The rage found is fully consistent with the Li abundances in sedimentary rocks.

Be data are very scanty in the literature, based almost entirely on emission work. The few data reported for several tektites (6,7) fall in the narrow range of 1-4 ppm. Our Muong-Nong samples revealed a similar range of Be abundances, with a variation from 1.95 ppm to 5.51 ppm and an average of 3.70± 0.81 ppm. This is consistent with terrestrial abundances, too.

Our preliminary boron data, ranging from 20.6 to 44.3 ppm fall in about the same range than in normal splash-form tektites, with a perhaps very slight enrichment. Preuss (6) reports a range from 6-22 ppm in australites, with an average of 13 ppm (10 samples); Taylor and Kaye (9) report a range from 3-55 ppm with an average of 27.2 ppm in 41 australites. Again, this range is consistent with a sandstone parent material. For further boron data and discussions see upcoming papers by the authors.

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TABLE 1: Li,Be, and B ABUNDANCES IN MUONG-NONG TYPE TEKTITES

Sample No.	Li (ppm)	Be (ppm)	B (ppm)
MN 8301	57.5	4.3	44.3
MN 8302	35.0	3.2	27.7
MN 8303	38.1	3.8	
MN 8304	37.2	2.7	
MN 8305	26.5	3.1	
MN 8306	41.8	4.5	34.7
MN 8307	44.5	3.4	
MN 8308	48.0	4.4	
MN 8309	49.8	3.7	
MN 8310	50.5	3.4	
MN 8311	42.9	4.0	
MN 8312	35.1	3.6	
MN 8313	41.2	4.1	
MN 8314	38.4	3.3	
MN 8315	41.0	2.9	
MN 8316	43.9	4.4	
MN 8317	47.2	4.3	
MN 8318	32.3	1.9	20.6
MN 8319	48.9	5.5	

ICP comparison for B of MN 8301: 41.3ppm, a thailandite 11.9ppm B.