# ATTEMPT TO INTERPRET IR SPECTRA OF WATER-BEARING HAWAIITE GLASSES IN THE REGION 300-600 $cm^{-1}$

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Financial support by RFBR, grant N 00-05-64990

**Herald of the Earth Sciences Department RAS, № 1(20)′2002**
URL: *http://www.scgis.ru/russian/cp1251/h_dgggms/1-2002/informbul-1.htm#magm-12.engl*

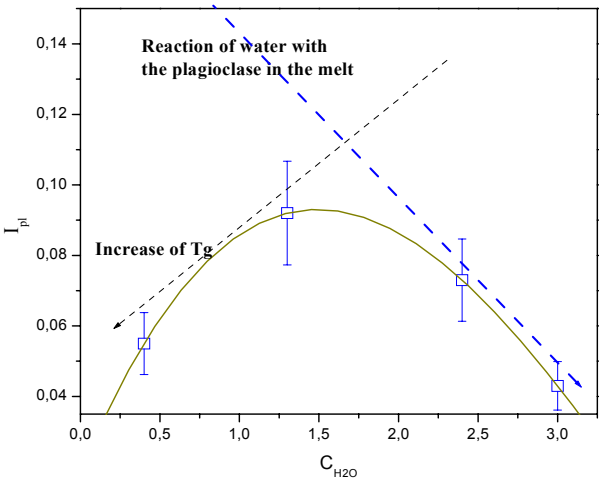
Complex investigations of the diagram of fusibility and kinetics of growth of crystalline phases from water-bearing hawaiite melts at moderate and low pressures of aqueous fluid are represented by us. As in other silicate systems, water, dissolving in the melt, reacts with the elements of its structure and changes mineral activity. Plagioclase liquidus decreases mostly due to the decrease of activity of plagioclase minals in the melt. There is a principal possibility to fix a change of the absolute content of plagioclase structural minals in the melt on IR spectra. Configuration vibrations with rather low energy in the region of 300-600 $cm^{-1}$ carry information on the degree of deviation of the angle T-O-T (T=Si, Al) from the ideal tetrahedral one in different structural units. In completely polymerized melts T-O-T angles distribute themselves round the maxima corresponding to the four-member and six-member rings. This idea is confirmed by the study of IR spectra in the melts of the systems Ab-An, Ab-Or-Q, granodiorite-water-chloride. In basaltic depolimeralized melts we are to expect that the fragments of the open chains with sufficiently wide distribution of the angles T-O-T will predominate in the melt. Only structural plagioclase units being in the melt can exist in the form of closed four-member rings. Since a demand for a total closeness of all the T-O-T relations is absent, these rings can have a rather fixed structure and narrow lines of absorption.

The preliminarily prepared water-bearing of hawaiite composition with the content from 0.4 to 3 mass.% are investigated by IR spectroscopy method. It is revealed that IR spectra in the region 300-600 $cm^{-1}$ decompose into 2 lines (see table)

| №, Specimens | $H_2O$, mass.% | Relative intensity | Peak 1 ($cm^{-1}$) | Peak 2 ($cm^{-1}$) |
|---|---|---|---|---|
| BT-34 | 3.0 | 0.043 | 451 | 466 |
| BT-53 | 2.5 | 0.052 | 452 | 468 |
| BT-40 | 2.4 | 0.073 | 452 | 464 |
| BT-51 | 1.3 | 0.092 | 453 | 459 |
| BT-52 | 0.4 | 0.055 | 454 | 465 |

One wide line with maximum of about 450-455 $cm^{-1}$ and the second narrow one with the maximum of about 465 $cm^{-1}$. We have interpreted the second line as corresponding to plagioclase minals. A relative square of "plagioclase" line reaches maximum at water content in the melt of about 1.3 mass.%, i.e. this melt demonstrates the greatest tendency to form feldspar structural and plagioclase crystallization.

One can make a preliminary conclusion that at cooling the structuring of the network with the formation of rings, nuclei, crystals starts. Water destroys structural units, but it also decreases malt viscosity. Glass making and freezing of the structure takes place at reaching rather large viscosity (about $10^{13}$ for T~Tg), i.e. melts with a large content of water reach lower temperatures at glass formation. The optimum of temperatures is for the water number of about 1.3 mass.%. At less contents of water the effect of rise of melt viscosity predominates, but at more water contents destructure effect predominates.


Reaction of water with
the plagioclase in the melt
Increase of Tg
0,14
0,12
0,10
0,08
0,06
0,04
$I_{pl}$
0,0
0,5
1,0
1,5
2,0
2,5
3,0
$C_{H2O}$