

# THE REDOX STATE OF UPPER MANTLE: EXPERIMENTAL DATA OF INTRINSIC OXYGEN FUGACITY FOR OLIVINES AND ORTHOPYROXENES OF SHAVARYN-TSARAM VOLCANO AND DARIGANGA PLATEAU (MONGOLIA)

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In this paper we represent the experimental data of intrinsic oxygen fugacity ( $f_{O_2}$ ) for ten olivines (Ol) and two orthopyroxenes (Opx) from the xenoliths of spinel lherzolites and harzburgites of Shavaryn-Tsaram volcano and Dariganga plateau (Mongolia). Practically, all investigated sample are the mantle xenoliths in the young basalts rock, connected between each other with interstove processes. The basalts is about 1,6 mln years old. Crystals in the nodules are from middle to large size and all of them are very clean. All the rocks are fresh and are not exposed to secondary changes. The determinations of  $f_{O_2}$  were carried out on the high-temperature furnace with two solid electrolytes from 800°C to 1150°C and at 1 atm. The results of the experiments are on the table.

The values of coefficients A and B in the equation of  $\log f_{O_2} = A - B/T^\circ K$  for Ol and Opx

Sample	A	B	n*	r**
Sh-Ts 3-2 Ol spinel lherzolite	9,182	29142,1	9	0,996
Sh-Ts 3-2 Opx spinel lherzolite	9,364	29594,7	10	0,996
Sh-Ts 8530/18 Ol depleting spinel harzburgite	13,206	33738,5	11	0,999
Sh-Ts 8530/18 Opx depleting spinel harzburgite	9,987	30137,2	8	0,996
Sh-Ts 4230/11 Ol spinel lherzolite	9,395	29565,4	9	0,997
Sh-Ts 4230/12 Ol spinel lherzolite	13,669	33596,2	11	0,944
Sh-Ts 4230/13 Ol spinel lherzolite	12,300	33648,6	8	0,999
Sh-Ts 4230/16 Ol spinel lherzolite (micaceous metasomatic)	6,378	26931,5	10	0,991
Dar 8505/2 Ol spinel lherzolite	7,685	27381,3	7	0,991
Dar 8520/6 Ol rock with partial melting "in situ"	9,931	30114,9	9	0,995

n\*- the quantity of experimental points, r\*\* coefficient of correlation.

Almost in all investigated samples we saw the explosion of gas-fluid inclusions, but they didn't influenced on the redox state of the samples. The experiments shows, that the values of  $f_{O_2}$  of the minerals from xenoliths of spinel lherzolites from the alkaline basalts of Shavaryn-Tsaram volcano and Dariganga plateau lead us to the conclusion, that the formations of this minerals were very close to the area of buffers equilibrium of IW-WM. The comparison of the experimental and thermodynamic data of the estimation of  $f_{O_2}$  values for the depth crystals and minerals equilibrium permit us to suppose the possibility of wide variations of intrinsic oxygen fugacity in the evolution of peridotites of upper mantle, which is obviously reflect the complex processes of differentiation in it (melting, degassing, metasomatoses and so on). It should to mention, that we studied the problem of intrinsic oxygen fugacity of the minerals of spinel lherzolites of Mongolia, the Baikal Rift Zone (BRZ) and the Tien-Shan region before [1-3]. If we compared the values of  $f_{O_2}$  received for the minerals from spinel lherzolites of Mongolia with the values of  $f_{O_2}$  for minerals of the BRZ, we can see, that the last values lies in the area of buffers equilibrium of WM and they are on 2-3 orders lower  $f_{O_2}$ , then the values of  $f_{O_2}$  that typical for basaltic outpouring and they are very closely for the redox state of spinel lherzolites of Mongolia. However, in differ from the last one, it is not typical of wide variation of  $f_{O_2}$  and the presence of low values of  $f_{O_2}$  close to the buffer equilibrium of IW, which was received as for the spinel lherzolites of Mongolia as to the mantle xenoliths South and Middle Tien-Shan [3].

## References

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