LITHOPHILE ELEMENTS IN IMPACT PROCESS: EXPERIMENTAL DATA.

O.I.Yakovlev, and A.Yu.Ljul. Vernadsky Inst., Acad.Sci., USSR, Moscow, 117975, Kosygin St.,19.

The content of Na,K,Rb,U,Th,La,Sm,Eu,Yb,Sc in the condensates produced in impact vaporization experiments has been investigated by INAA method. The experiments were carried out using two stage- gas gun (1). The condensates presented vapors quenched on the cool surface of Al-foil during expansion of vapor cloud. The impact experiments were done on basalt target with copper projectile (velocity 6.04 km/s) and on granite target with Fe-Ni meteorite projectile (velocity 5.63 km/s). The surfaces of Al-foils were placed at 5-7 cm from the target.For separation vapor and dust particles there were used several kapron net layers with cell 0.1mm. The ultrathin dust (0.5-1μ) accumulating on the condensate surface was usually blown off by air stream.

As the Al-foil was "neutral" materials in respect of INAA the method permitted to analyse the thin condensate layer together with foil. For comparison the analytical data of targets and condensates the ratios element/Sc and element/Na were calculated. The formula for calculation of the ratio in condensates is:

$$\frac{C_i^c}{C_{Sc(Na)}} = \frac{(C_i - C_i^f) + K \cdot C_i}{(C_{Sc(Na)} - C_{Sc(Na)}^f) + K \cdot C_{Sc(Na)}}, \text{ where}$$

C_i, C_{Sc} - the content of i element and Sc or Na in samples (condensate + Al-foil); $C_i^f, C_{Sc(Na)}^f$ - the content of i element and Sc or Na in Al-foil; K - the ratio of condensate mass to Al-foil mass.As K was equal to ~ 0.01 we used in our calculation simple formula: $C_i^c/C_{Sc(Na)}^c = (C_i - C_i^f)/(C_{Sc(Na)} - C_{Sc(Na)}^f)$.

The comparisons of obtained ratios in targets and condensates are shown in fig.1,2,3,4. In these figures we also show the total error which consists of the measurement error as well as the errors obtained by calculation of these ratios.

The results lead to the conclusions: 1.Both volatile (Na,K,Rb) and nonvolatile (U,Th,REE) lithophile elements are found to pre-

LITHOPHILE ELEMENTS IN IMPACT... Yakovlev O.I.& Ljul A.Yu.

dominantly enrich the vapor relative to Sc. These occur at impact vaporization as basalt as granit targets. 2.As a rule the ratios nonvolatile/Na are higher in vapor in comparison with basalt target. This "strange" result seem to be explained by nonequilibrium character of impact vaporization.

Ref.:1.Yakovlev O.I. et al.,(1988),Geochemistry,12,p.1698-1707 (in Russian)

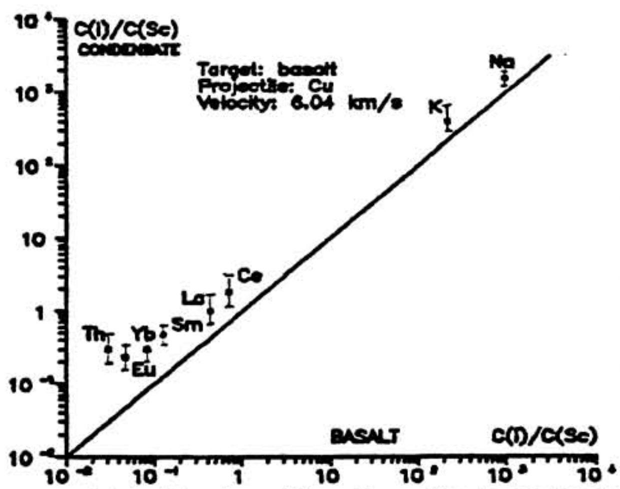

Fig.1 The element/scandium ratios in condensate in comparison with basalt-target.

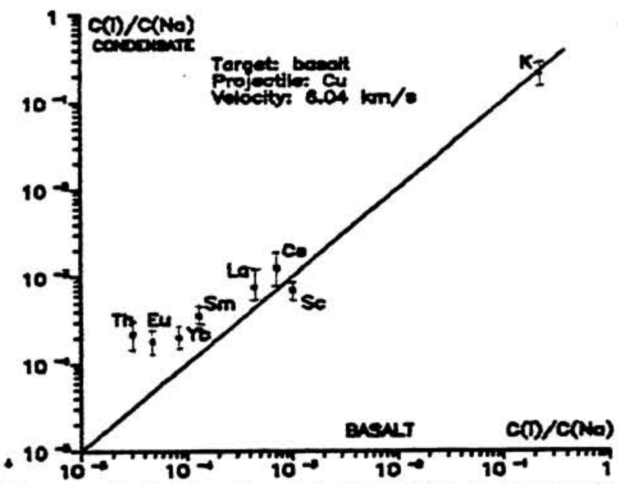

Fig.2 The element/sodium ratios in condensate in comparison with basalt-target.

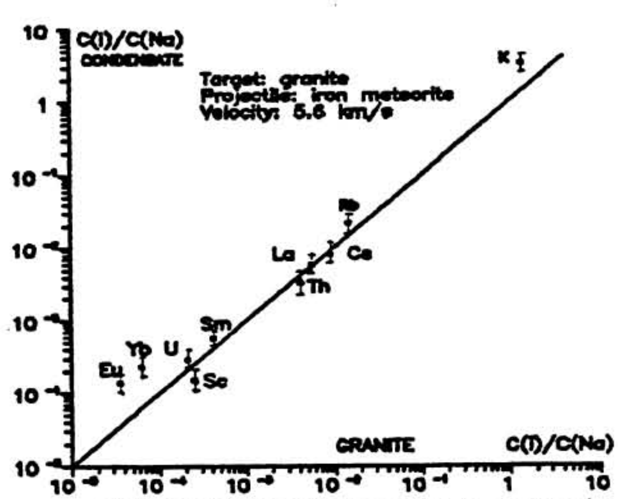

Fig.3 The element/sodium ratios in condensate in comparison with granite-target.

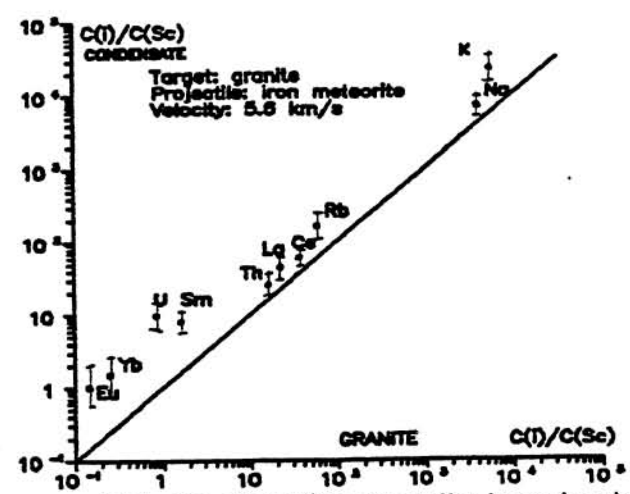

Fig.4 The element/scandium ratios in condensate in comparison with granite-target.