SHOCK DEFORMATION IN TALC AND ITS POSSIBLE SIGNIFICANCE FOR INVESTIGATIONS OF ASTROBLEMES; A. A. Valter, Institute of Geochemistry and Physics of Minerals, Acad. Sci. of Ukraine, 34, Palladin Ave., 142 Kiev, 252680, Ukraine

Diaplectic talk with the atomic Fe/Mg ratio of 1:9 (talk-1) and 1:2 (talk-2) has been found in the Terny astrobleme /1-3/ of the Krivoi Rog basin, Ukraine, in the rocks which have been subjected to the impulse pressure of 3-4 and 10-12 GPa respectively. The planar cleavage and mechanical twins parallel to (100),(010), (213) and other planes are developed.The width of twin lamellae is supposed to be used for the estimation of impulse action duration.The anomalously strong coloring of diaplectic talk is likely to be applied for its distances diagnostics.

Talk-1 crystals (up to 2 cm) have been ascertained in metasomatic bodies among the microgneiss in the base of ring depression.Talk-2 has been discovered as poikilitic crystals (0,5- 2mm) in blocks of ferruginous quartzites from the denudated uplift.The block size of talk has been distinguished as apr. 10-100 nm and for talk-2 less than for talk-1 by X-ray and electron microscopy methods. Fractures of the shock cleavage systems density makes up 10^{2} -10^{6} mm. The width of shock twins varies from less than 1 to 100 μm (fig.1,2).The finest twin lamellaes have accomodation bands around them.This bands have an intermediate optical orientation between the host crystal and twin lamella (fig.3).The normal twins are predominant but the axial ones are also present.

In 50 crystals of talk-1 and in 20 ones of talk-2, orientation of twinning and cleavage planes has been measured according to the axis of the optical indicatrix.On the stereographic projection the points of shock features orientations have formed thickenings which were indexed by the comparison with calculated data for the planes with low indexes of talk structure.

The established orientations of the twinning and cleavage planes have coincided with (100) 12%;(010) 10%;(213) 10%;{241} 13%;(403) 6% and others.

The systems of fissures are formed in the rarefaction wave. Evidently,their orientations mark out the planes of the highest stresses which are the twinning and translation gliding planes. With regard for gliding on (001), the gliding direction has been determined as [100] or [010] as well as [210],[201] and others. In talk-2 the part of gliding direction which do not coincide with indicatrix axis exceeds that of talk-1. In some cases the shear plane for twins is near to (010).The shear direction is near to [014].In this direction the one-dimensional Si-O-Mg(Fe)-O chains with high atomic density may be distinguished.

SHOK - DEFORMATION IN TALK

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The difference between shock features of talk and micas can be explaned by the low static and dynamic elastic limits of talk, i.e. by the formation of residual twins under relatively low pressures. The rate of mecanical twins lenghth is $n.10^{6}$ mm/s in growth and only near 10^{-1} mm/s in width [4]. Accordingly, the width of twins lamellas in talk may be used for the estimation of shock pressure duration. The widest twin lamellas (up to 100 μm) are discovered in veined impact breccia where the pressure action duration is estimated as 0,n of a second.

The diaplectic talk has an anomalously deep green colouring which is probably due to thin Fe minerals inclusions. The maximumes of absorption measured by Dr. V.M. Khomenko make up 470 and 600 nm(Fe^{3+} in octahedrons), 1050 nm (Fe^{2+} in octahedrons) and the charge transfer band Fe^{2+} oct.-Fe^{3+} oct (680 nm).

The deep colouring of diaplectic talk makes possible its diagnostics at great distances on the planet bodies with the basic silicate crusts. Ref.: 1. Masazitis, V.L. et al. (1981) LPSC, XII, p.655. 2. Valter, A.A. et al (1987) LPSC, XVIII, p.1032. 3. Valter, A.A. et al. (1989) LPSC, XX, p. 1148. 4. Klassen-Nehludova, M.V. (1960) Mecanical twinning in crystals. Moscow, 1960 (in Russian).

Fig.1. The cross-section of talk near (001). The twins on (010) and cleavage on (100). Ni x.

Fig.2. The wide twins of talk crystals from breccia. Ni x.

Fig.3. Twins of talk with accomodation bands