DUBA, A., Ho, P., and Piwinskii, A. J., Electrical conductivity studies of igneous rocks: fusion of basalt, Eos Trans. AGU 56, 1075 (1975). [UCRL-77320, Abstract]

The electrical conductivity (σ) of Picture Gorge basalt (augite - 50.1%, labradorite - 35.6%, olivine - 0.6%, opaques - 11.5%, glass - 1.2%, clay - 1.0%; modal analysis by A. C. Waters), measured at 1000°C at an oxygen fugacity $f(O_2)$ near the quartz-fayalite-magnetite buffer (100 kPa total pressure), is an order of magnitude lower than previously reported for basalt. This low σ is still 100 times greater than olivine ($Fo_{90}Fa_{10}$) at the same $f(O_2)$ and temperature. The σ increases by two orders of magnitude within an hour when this basalt undergoes partial melting at temperatures up to 1160°C (solidus temperature = 1020 ± 8°C determined by R. F. Fudali). A kinetic study at 1053°C indicates that an approximate equilibrium σ is attained after about 130 h and that only 50% of the total increase in σ is observed in the first 15 h. Both the time dependence of, and increase in, σ could result from partial melting, disorder phenomena, or some other mineralogical reaction involving the other phases present. Regardless of the cause of the observed σ increase, these data indicate that time is a critical parameter in the interpretation of σ changes associated with phase transitions, and that $f(O_2)$ control is mandatory if laboratory σ data corresponding to geologic conditions are desired for Fe-bearing systems.

Duba, A., JOHNSON, Q., and Shankland, T. J., Orientation of olivine single crystals, Lawrence Livermore Laboratory, Rept. UCRL-77375, Preprint (1975).

Laue photographs of the three principal directions in olivine are presented as an aid in the correct determination of crystallographic orientation.

Duba, A., HEARD, H. C., Abey, A. E., and Bonner, B. P., Stress-strain behavior of polycrystalline NaCl to 3.2 GPa, Lawrence Livermore Laboratory, Rept. UCRL-51743 (1975).

Duba, A. and SCHOCK, R. N., The effect of electrical potential on scale formation in Salton Sea brine, Lawrence Livermore Laboratory, Rept. UCRL-51944 (1975).

Duba, A., HEARD, H. C., Piwinskii, A. J., and Schock, R. N., Electrical condictivity studies: refinement of the selenotherm, Sixth Lunar Sci. Conf., Houston, March 17-21, 1975. [UCRL-74606, Abstract]

Duba, A., SCHOCK, R. N., Heard, H. C., and Stromberg, H. D., The electrical conductivity of polycrystalline olivine to 5.0 GPa (50 kbar), Sixth Lunar Sci. Conf., Houston, March 17-21, 1975. [UCRL-76402, Abstract]