DUBA, A., Piwinskii, A. J., and Santor, M. L., Laboratory electrical conductivity studies: geothermal prospecting aids, Second U.N. Sym. Develop. and Use of Geothermal Resources, San Francisco, May 20-29, 1975. [UCRL-76404, Abstract]

Measurements on Nugget, Kayenta, and St. Peter sandstones, Indiana limestone, and Westerly granite under ambient conditions indicate that electrical conductivity ($\sigma$) is dependent on rock type, volume porosity, fluid concentration, and type of fluid. In a water-saturated rock, the $\sigma$ measured is dependent on the salinity of the solution. These data indicate that for a variety of sedimentary and igneous rocks, it may be possible to distinguish regions of high-salinity brines from those where the brines are less saline by field-resistivity measurements. Such exploration aids would be especially beneficial in vapor-dominated geothermal systems such as those in the Salton Sea area.

DUBA, A., and Piwinskii, A. J., The electrical conductivity of high albite throughout its melting interval at atmospheric pressure, Eos Trans. AGU 56, 463 (1975). [UCRL-76605, Abstract]

The electrical conductivity ($\sigma$) of single-crystal Amelia albite has been measured parallel to the b-axis under controlled oxygen fugacity near the QFM buffer in the temperature range 1209-1423 K. Prior to melting, the single crystal was disordered by heating in the following manner: 798 h at 1353 K, 1189 h at 1373 K, and 862 h at 1378 K. During this time period, $\sigma$ increased approximately 2.7 decades at a frequency ($\nu$) of 10 kHz. The $\sigma$ of high albite was then measured as a function of time during melting at 1406 and 1423 K and frequencies at 200 Hz to 10 kHz. Within the first 50 h at 1406 K, the $\sigma$ (measured at 1 to 10 kHz) increased by a factor of 4 and the $\sigma$ (measured at 200 and 500 Hz) decreased by less than a factor of 2. Thus, at all frequencies, the $\sigma$ of single-crystal high albite changed less than half an order of magnitude during melting at 1406 $\pm$ 5 K. Furthermore, the sense and magnitude of this change in $\sigma$ are strongly dependent on $\nu$. These new data further qualify the 1965 observations of Khitarov and Slutskii regarding the sharp increase (approximately two decades at a $\nu$ of 10 kHz) in $\sigma$ on melting albite. In silicate systems such as albite, which exhibit order-disorder phenomena, the degree of disorder attained in the solid state prior to melting appears to control the $\sigma$ change observed upon melting.