ROV [24] on granite must be used with caution since time was not a significant variable in their experiments. Hence, equilibrium was not attained. When time is considered in materials which show increases in σ upon disordering below melting, no significant electrical distinction may be made between a partial melt and a solid of similar composition which is slightly cooler.

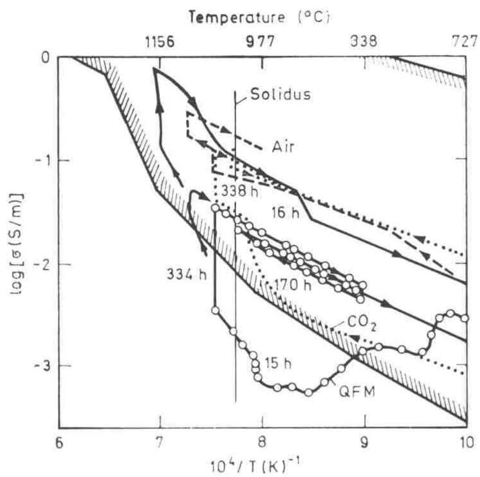

Fig. 7. The electrical conductivity of basalt (DUBA et al. [16]). Lines are coded for f_{O_2}: solid lines are for CO_2/CO gas mix near the QMF buffer, dotted lines for pure CO_2, and broken lines for air. Constant temperature portions of lines are indicated by heavy shading, with time, in hours, to the side. Normal heating rate is 100 °C/h. The solidus for this material is indicated by the vertical line. The heavy lines with almost vertical shading are the limits of literature σ data for basalt

However, partial melts such as basalt in a solid whose σ is controlled by olivine will show a conductivity contrast of two to four orders of magnitude from the data presented in Figs 3 and 7.

6. Conclusion

In summary, temperature and f_{O_2} are the most important variables to consider in the interpretation of laboratory σ measurements. In addition, kinetics becomes important if a time-dependent reaction such as order–disorder has a significant effect on σ as in albite and basalt. Pressure is not a significant variable except where it produces crack closure which limits water movement in rocks near the surface [4] and at depth where phase transitions may be involved.

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