

SELF-DIFFUSION IN THALLIUM

BY

GEORGE A. SHIRN

Submitted to the Faculty of
Rensselaer Polytechnic Institute
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

Troy, New York

May, 1954

631 ✓
Shirn

ABSTRACT

The self-diffusion of single crystal thallium has been measured from 150°C. to 275°C. with the use of Tl^{204} as a tracer and the standard sectioning technique. For diffusion parallel to the c-axis the data were well fitted by an activation energy of $Q_{\parallel} 22.9$ kcal/mol and a D_0 0.4 $cm^2/sec.$, and for diffusion perpendicular to the c-axis $Q_{\perp} 22.6$ kcal/mol and D_0 0.4 $cm^2/sec.$ The cubic phase was investigated also and resulted in the values $Q_c 20.0$ kcal/mol and D_0 of order 0.7 $cm^2/sec.$ Possible mechanisms are discussed.