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Estimating the viscosity coefficient of liquid metals from Vibration-Transit theory ERIC CHISOLM, DUANE WALLACE, Theoretical Division, Los Alamos National Laboratory — We describe and test a simple method for calculating the viscosity coefficient η for liquid metals over a range of densities and temperatures. The method uses a model of atomic motion in a liquid based on the Vibration-Transit (V-T) theory of liquid dynamics to calculate the self-diffusion coefficient D, and then uses D and the Stokes-Einstein relation to compute η. We consider the accuracy of both the V-T model for D and the Stokes-Einstein relation; we then compute η for 21 liquid metals at melt at 1 bar, finding that our results agree with experiment to 18% accuracy. This is somewhat more accurate than other empirical methods and not much less accurate than first priciples molecular dynamics calculations, while being substantially less computationally intensive than the latter.

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