Recommended Density Values of Transition Metals

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Liquid density is not only a necessary input parameter in physical models and numerical simulations, but also an important thermophysical property for understanding the nature of liquids. Although lots of density measurements have been reported, the uncertainty is largely distributed and the density values of high melting temperature materials are unclear due to contamination, measurement methods, analysis tools, and personal skills. Therefore, recommended density data should be defined for practical and simulation study. In the present work, we systematically measure the liquid densities of seventeen transition metals by using electrostatic levitation (ESL), and compare our results with the data in the literature measured by various techniques. After carefully reviewing the measurements in the literature, we suggest the recommended liquid densities of these transition metals and alloys with uncertainty evaluation of the density measurements. We also address the detailed uncertainty factors of the density measurements and possible sources for the density discrepancies using different techniques.