

Thermophysical Property Measurements of Silicon-Transition Metal Alloys

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Metals and metallic alloys often have high melting temperatures and highly reactive liquids. Processing reactive liquids in containers can result in significant contamination and limited undercooling. This is particularly true for molten silicon and its alloys. Silicon is commonly termed “the universal solvent”. The viscosity, surface tension, and density of several silicon-transition metal alloys were determined using the Electrostatic Levitator system at the Marshall Space Flight Center. The temperature dependence of the viscosity followed an Arrhenius dependence, and the surface tension followed a linear temperature dependence. The density of the melts, including the undercooled region, showed a linear behavior as well. Viscosity and surface tension values were obtained for several of the alloys in the undercooled region.