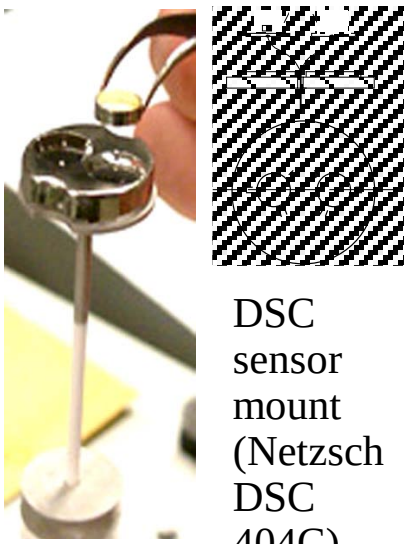
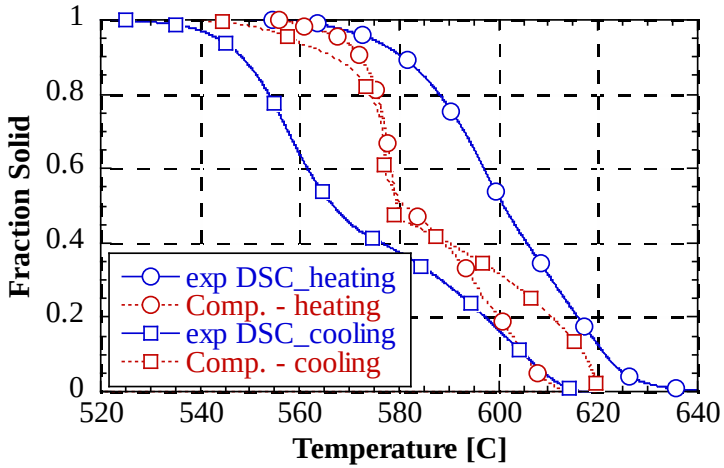
More Accurate Data on Solid Fraction Are Obtained by Performing an Inverse Analysis of the Measurement Processes



DSC sensor mount (Netzsch DSC 404C).

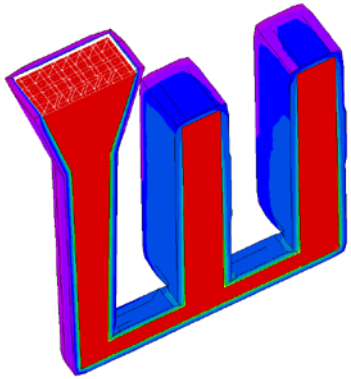


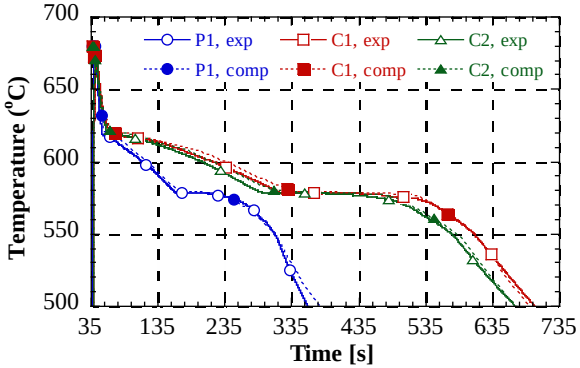
$$\mathbf{M}[\dot{y}]^T + \mathbf{A}_C[y]^T + \mathbf{A}_R\left[y^4\right]^T = b$$

$$\mathbf{A}_C = \mathbf{A}_C\left(y, \tau_{Cj;\, j=1,N}\right) \quad \mathbf{A}_R = \mathbf{A}_R\left(y, \tau_{Rj;\, j=1,N}\right)$$

τ_C – *conduction parameters*

τ_R – *radiation parameters*





Fraction solid for an A356 aluminum alloy was successfully determined by post-processing the DSC data using the ORNL analytical model.

Application for the investment casting. Cooling curves for plate castings show good agreement with experimental data.

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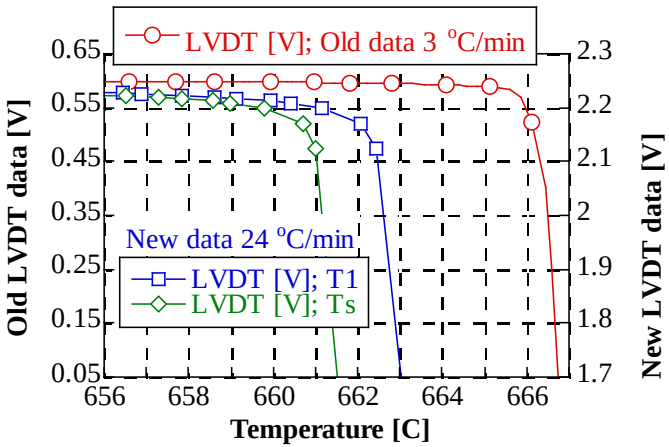
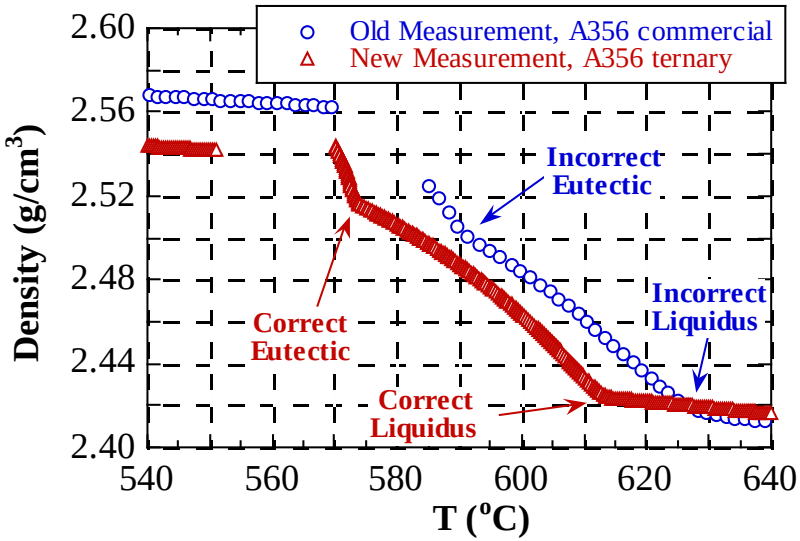
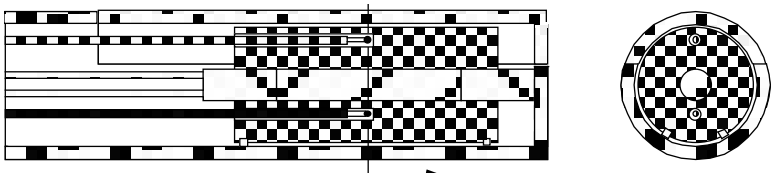
Density in the Semi-solid Zone for Solidification Processing Was Improved



Dilatometry (LVDT) data for pure Al. The melting point is 666, 662.3, and 661 °C for the old set-up, and new setup.



More accurate densities are determined using new sample holder.



New design

New sample holder.