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Visualization of the Flow Structure and Temperature Field in the Region of Mixed Convection

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The results of experimental simulation of mixed convection in the process of single-crystal growth by Czochralski method are presented. Visualizations were done by dispersed encapsulated liquid crystals, which enable simultaneous measurements of the velocity and temperature fields. Experimental analysis was done for the cylindrical vessel kept in the isothermal conditions. The temperature difference occurred between the rotated crystal simulating ring and the melt. The experimental conditions depended on the non-dimensional parameters like Prandtl number, Reynolds number and Grashof number. The velocity fields showed appearance of vertical structures, whose number, shape and movement depend strongly on the Reynolds number. Velocity vectors maps are compared with the isotherms.

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