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電磁浮遊中の液滴内熱流動におけるマランゴニ効果の影響

Marangoni Effect on Thermofluidics in Droplet in the Electro-Magnetic Levitation

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In order for understanding the containerless processing of molten titanium, the thermofluidics in a droplet levitated by the electro-magnetic force is numerically simulated. The continuity, Navier-Stokes and energy equations are coupled by considering the Lorenz force and Joule heat generated by the high frequency coil, the buoyancy convection and the Marangoni effect. This study focuses on the Marangoni effect, which has not been taken into account in previous numerical studies[1]. In this numerical simulation, the flow field is assumed as axisymmetric, and the droplet is assumed as sphere, and both the static and the dynamic deformation are neglected.. **Fig.1** shows the representative result, which indicates the distribution of the Lorentz force and velocity in a droplet.
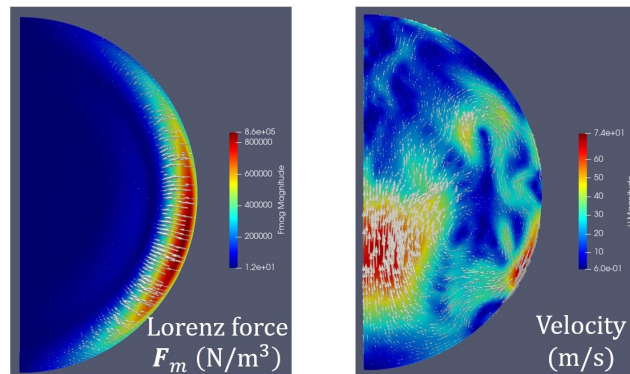
This study is a part of [Hetero-3D project].

Fig.1 Vectors and absolute values of Lorentz force and velocity in a electro-magnetic levitated droplet.

References

1)   Valdis BOJAREVICS and Koulis PERICLEOUS, ISIJ International, **Vol.43**(2003), pp. 890-898