

Crystallization of Ice by LLIP Method under Magnetic Field III 液 - 液界面析出法による氷の結晶作製に対する磁場効果Ⅲ

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The ice crystal was made by the liquid-liquid interfacial precipitation (LLIP) method and the magnetic field effect (MFE) on crystallization of ice was studied under horizontal magnetic fields. We have reported the MFEs for the fullerene nano-whisker: it was oriented perpendicular to the magnetic flux and the diameter and the length were enlarged by 6 and 1.3 times, respectively. The same MFEs were reported for other molecular crystals, for example glycine and lysozyme. As the MFEs of the dendrite ice, the length of the branch was elongated under a vertical gradient magnetic field. On the other hand, the position of the roots of the dendrite was localized in a reactor under the horizontal magnetic field as shown in Fig. 1 (a). In this study, the mechanism of the change of the position of the roots is researched.

The 1-butanol including a small amount of water and toluene were prepared as a good solvent and a poor one, respectively. Toluene of 1.0 mL was soaked into the glass made reactor with $10 \times 10 \times 30 \text{ mm}^3$. Then, the 1.0 mL of the aqueous solution with 1-butanol (93 wt.%) was stacked gently on the poor solvent to make the interface. The crystal growth of ice was observed for a few hours at -16°C under the horizontal homogeneous magnetic field of up to 10 T by a CCD camera *in situ*.

Figure 1 (b) showed the dendrite ice made under the horizontal homogeneous magnetic field of 10 T. Its distribution of the angle between trunk and magnetic flux as shown in Fig. 1(c) indicated no relation to orientation. As a result, it is considered that there were other factors in the change of the position of the roots. We will research the influence of the magnetic force to investigate the cause this phenomenon.

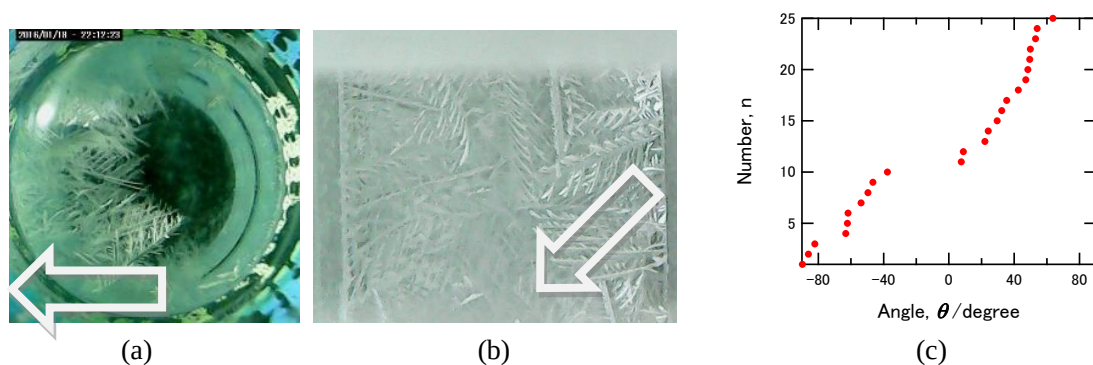


Fig. 1. Dendrite ice grown (a) in circle interface, and (b) in squared interface. (c) The distribution of the angle between the trunks and the magnetic flux was carried out from (b). The magnetic flux was illustrated by the arrow.

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