

Crystalline Structure of Ice Developing by Accretion of Supercooled Water Droplets on a Single Wire and Growth Process of Rime on a Square Board Placed in the Air Flow Containing Supercooled Droplets and Snow Flakes

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Ice fabrics or crystalline structures of ice formed by accretion of supercooled water droplets have been observed by many authors, by making a thin section of ice which allows examination of crystal structure between crossed polaroids. It has been shown that ice crystals formed by accretion of supercooled droplets consisted of many columnar grains developed in the growth direction. Therefore, it is interesting to observe crystalline structure of ice growing on a single wire by accretion of supercooled water droplets. A rigid frame stretched with a fine metallic wire (0.001 m in diameter) was placed on a microscope stage in such a way that the surface of stretched wire was brought into the focus of an objective lens of the microscope. The microscope was placed in a wind tunnel where cold air containing supercooled water droplets was flowing continuously. The rime process on the stretched wire was recorded cinematographically through microscope.

The time lapse movies of icing process taken in a cold room of the Institute of Low Temperature Science indicated that supercooled water droplets captured on a metallic wire increased their size by the successive impingement without being subjected to any freezing even at -10°C , and that when the size of droplets attained $0.003\sim 0.005$ m in diameter, freezing

Figure 1. Photomicrograph of growing front of ice. 10m/sec : -10°C

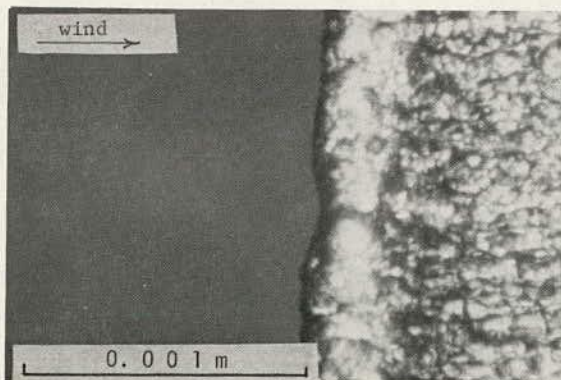


Figure 2. Photomicrograph of growing front of ice. 3.5m/sec : -10°C

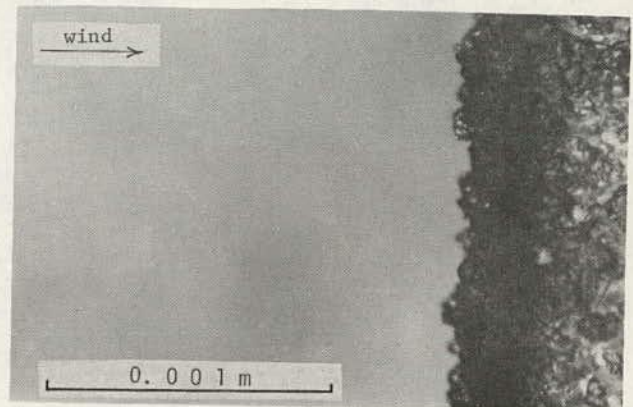
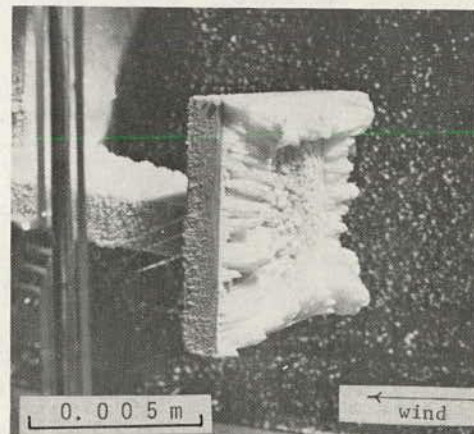


Figure 3. Rime deposits on a square board.



occurred spontaneously on a particular droplet, nucleating successively adjacent droplets. According to our observation, if wind speed differs, the appearance of ice formed by accretion of water drop-

lets was different even at the same degree of supercooling. Figure 1 and 2 show photomicrographs of growing fronts of ice taken at 10m/sec and 3.5m/sec respectively.

On the summit of mountain covered with snow, icing on structures is created by not only accretion of supercooled water droplets but also by adhering of snow flakes. Icing process on a wooden square board placed in the air flow containing supercooled water droplets and snow flakes was observed at the summit of Mt.Zao (1660 m in altitute). A time lapse movie indicated that no snow flakes adhered on the surface of the board until long rimes developed along the circumference of the board as shown in Figure 3. Snow flakes impinging on the board began to deposit in a hollow space being surrounded by long deposits of rimes developed at the edge of the board.