



Sub-second Sintering of Ice

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Ice grains bond together at contact times less than one second. The tensile strength of the bond formed between polycrystalline ice cones was measured in the contact time range of 10-1000 ms as a function of temperature and contact load. A non-zero bond strength could be measured even after the shortest contact. The bond strength increases non-linearly with increasing temperature, and it is most pronounced close to the melting point. The strength depends linearly on contact load. The results indicate that the basic mechanism of ice sintering on this time scale is the freezing of the liquid-like layer present on the surface of the ice. The observed time, temperature, and load dependence could be explained by the creep of ice that largely depend on these parameters.