

## Heating inside a highly-porous dust aggregate

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At the beginning of planetary formation, highly porous dust aggregates are formed. Outside the snowline, the main component of an aggregate is H<sub>2</sub>O ice. Because H<sub>2</sub>O ice is formed as amorphous ice, its thermal conductivity is small. Thermal conductivity of icy dust aggregate is small accordingly. Then it is possible to heat up inside an aggregate due to decay of radionuclides contained in silicate cores of dust grains. It is shown that the temperature increases substantially inside an aggregate, leading to crystallization of amorphous ice. During the crystallization, temperature further increases enough to proceed sintering. The mechanical properties of icy dust aggregates can change greatly, and collisional evolution of dust aggregate is affected by sintering. The latent heat of crystallization depends on chemical composition of ice. The maximum temperature depends on the composition accordingly. If the amount of impurities is large, heating by crystallization is suppressed.

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