

## On the relation between the origins of aragonite and transition temperatures to calcite

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Aragonite, a polymorph of  $\text{CaCO}_3$ , is less stable than calcite in the ambient condition, but commonly forms with both biological and geological origins. In particular, aragonite as the biominerals seems important in the geoscience fields because it constitutes the fossils of hard tissues or becomes a carbon reservoir in the carbon cycle near the surface of the earth. Hence, it is interesting to know how the mineralogical stability is different between aragonites with different origins. For this purpose, we have investigated the transition temperatures of various biogenic aragonite to calcite by heating, using high-temperature XRD, as well as geological and synthetic ones. Among 21 specimens, almost biotic aragonites showed a transition temperature 60-100C lower than geological and synthetic ones. However, the shells of land snails (three species were examined) showed almost the same transition temperature as abiotic aragonites. Accordingly, it cannot be concluded that the biotic aragonite is always less stable than geological ones. Besides, aragonite of a coral showed an onset temperature of the transition around 40C lower than the other biotic aragonites.

Keywords: aragonite, calcite, phase transition, biomineral, X-ray diffraction