

## Precursory phenomena of thermal decomposition of calcite

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Nowadays, most of the fishery waste, such as scallops or oyster shells are incinerated as general waste at or above 1000 °C using a huge amount of fuels and cost and then the incineration products are used for landfill disposal. To reduce the incineration cost for developing the sustainable fishery industry, it is indispensable to find the optimized incineration process. The knowledge of the thermal decomposition kinetics is a key for the designing the incineration process.

One of the authors conducted the thermal decomposition experiment using DSC with adjusting the grain size for the calcite powder having the different chemical composition and revealed that the activation energy of the thermal decomposition is independent against the composition and grain size. However, it has been found that the activation energy of the thermal decomposition changes during the decomposition process indicating that the rate-limiting process is ununiform during the process. The change of the activation energy of the thermal decomposition process infers the existence of a precursory phenomenon of the decomposition.

To find the precursory phenomenon of the calcite thermal decomposition, in-situ observation of the thermal decomposition process was performed using a transmission electron microscope. In-situ observation reveals that the metastable phase was formed prior to the thermal decomposition. The change of the rate-limiting process of the thermal decomposition could be caused by the thermal decomposition through the metastable phase formation.

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