論文 / 著書情報
Article / Book Information

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Title(English)	Clumped-isotope thermometry of natural carbonate: application to high temporal resolution of biogenic and pedogenic carbonates
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種別(和文)	論文要旨
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（博士課程）
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論 文 要 旨

THESIS SUMMARY

専攻： Department of	Environmental Science and Technology	専攻	申請学位（専攻分野）： Academic Degree Requested	博士 Doctor of	（ Science ）
学籍番号： Student ID Number			指導教員（主）： Academic Advisor(main)	Naohiro Yoshida	
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要旨（英文 800 語程度）
Thesis Summary （approx.800 English Words ）

Clumped-isotope analysis was applied as a novel carbonate paleo-thermometry which is independent from environmental $\delta^{18}O$ water meaning. It is a direct way for calcification temperature reconstruction at the formation moment allowing estimate the oxygen isotopic composition of water equilibrated with the carbonate. Linear calibration curves performed for different types of carbonate between the temperature and the calculated Δ_{47} (mass-47 CO_2 measured on mass-spectrometer and equilibrated with stochastic distributed isotopologues). The finding shows the big uncertainty between these lines at controlled lower temperature for different types of carbonates. Recently, calibration line for research materials was suggested to form in order for temperature reconstruction. Re-crystallization process in the mineral lattice of carbonates (calcite/aragonite) or even effect by pressure or temperature of metamorphism has been change the Δ_{47} significantly. It is suggested to use well preserved samples for better quality paleo –environment reconstruction in Quaternary.

In Chapter 2 give description of the approach to sample analysis and tools which were applied in the dissertation. The main focus is determination of Δ_{47} precision during the measurement which effected on temperature precision and calibration of heated. Main compounds were taken from Yoshida et al. 2013 which performed the annual variability of heated gas possibly explained as room temperature/humidity variation in summer/winter season. Long-term variation of analyzed laboratorial standard Wako shown since 2007 period to 2011. We suggested to use the frame line between analyzed row data of Δ_{47} and published to calculate the “true” Δ_{47} values.

Chapter 3 characterizes the establishing the “clumped-isotope” technique for fresh biogenic carbonates (marine and continental mollusk) seasonal variation among the shell growth. Primer we performed the high temporal resolution profile of temperature variability among the shell growth and interpret as a clear seasonal change records. Compared to recent published paper Zaarur (2011) which were shown the bulk carbonate method treatment, we analyzed the high range samples drilled on the shell and performed a profile of temperature variability calculated from measured Δ_{47} values. It is notable that one of the explanations of that variability could be kinetic growth rate effect during the summer season. *Abalone* gastropod sample were applied for reconstruction high temporal resolution profile of $\delta^{13}C$, $\delta^{18}O$, Δ_{47} and estimated temperature and $\delta^{18}O$ of seawater. With assumption of oxygen isotopic water composition close to zero we applied the minimum and maximum peaks on the $\delta^{18}O$ carbonate profile and measured Δ_{47} for temperature reconstruction. It gives us the seasonal temperature variation which was also compared with an estimated temperature based on Kim and O’Neil equation between temperature of environment and difference between $\delta^{18}O$ in carbonate and water phase and observation temperature of surface seawater.

In the Chapter 4 core samples from North of Mongolia and Central India were applied corresponding to different geological epochs. Fossils fragments of shell mixed with the carbonaceous mudstone and sandstone materials representing cold and warm periods during 15 ky. Pedogenic carbonates from Satpura Basin, Central India representing mostly 200Ma were used for temperature reconstruction during plate migration from south latitudes to the present location in the equator. Investigating the paleo-magnitude of rock materials we found out similarity in the present and the past of Earth latitude variation. Compared to the present $\delta^{18}O$ values of meteoric water and estimated from material rock we could reconstruct the paleo-hydrological situation of the Indian plate during its migration.

Chapter 5 mostly summarized and conclude the main achievements in the dissertation and give some discussion for possible solution and further future aspects for the application of “clumped-isotope” technique.

備考 ： 論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 2 部提出してください。
Note: Thesis Summary should be submitted in either a copy of 2000 Japanese Characters or 300 Words (English) or 2 copies of 800 Words (English).