# Zircon fission track annealing: Short-term heating experiment toward the detection of frictional heat along active faults

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Murakami et al. (2002) reported the fission track (FT) shortening in the resistant zircon in the pseudotachylyte layers collected from the trench along the Nojima fault, and demonstrated the FT fading in zircon by laboratory annealing at 950°C for 1 sec, as previous FT annealing kinetic models predicted (Yamada et al., 1995, Tagami et al., 1998). The possibility was suggested to date the fault age, and to constrain the heat generation and transfer during or associated with faulting with the use of FT system quantitatively. Here we present the supplemental data and the analytical results of short-term annealing experiments.

Zircon separates from the Nisatai dacitie were employed to the annealing experiments. A graphite furnace was used to cook samples because of its durability and controllability of heat. An IR thermometer with the response time of 0.01 sec was used to gauge the temperature. The furnace and the IR thermometer were calibrated with a reference thermocouple. Infrared emittance from the furnace was monitored with IR sensor continuously. The initiation of heating samples was determined by detecting the changes in emittance at the grain drop on the furnace preheated at scheduled temperature. The end of heating was achieved by rapid cool down of the graphite furnace due to switching off after scheduled durations. The resultant accuracy of the heating temperature and duration was 5°C and 0.2 sec, respectively.

For the samples annealed for seconds to minutes at 500 to 1000°C, the measured FT lengths are concordant with those predicted by the previous kinetic models. This fact indicates that previous models can be extended to the shorter time ranges of seconds. Instead of previous ones, the kinetic models modified with these new experimental results should make FT thermochronological analyses more informative to the detection of frictional heat along active faults.

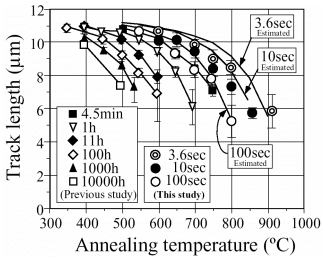


**Figure 1** preliminary plot of mean FT length versus temperature for isochronal series. Solid lines show predicted lengths by a previous model (Tagami et al., 1998).

# Microbial community under a hydrothermal system revealed by the analysis of water samples collected from bored holes

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Microbial community in hydrothermal area at seafloor has been analysed by culture-independent methods. Hydrothermal fluid samples from natural vents and vent chimneys have been analysed by PCR. Hyperthermophilic microbes have been isolated from these environments. Though the analysis of these samples provided the window to penetrate the microbial community under the seafloor, more direct analysis is desired for better understanding of the sub-seafloor microbial community.

In the “Archaean Park Project” supported by Special Coordination Fund, several holes were bored and cased in the crater of the Suiyo seamount on the Izu-Ogasawara arc, Japan (about 1,400 m depth) in 2001 and 2002. Hydrothermal fluid samples were collected from cased holes at various sites on Suiyo seamount. The fluid samples were filtered to collect the microbial cells. The DNA was extracted and used to amplify archaeal 16S rDNA by PCR using a bacteria-specific primer set. The PCR fragments were cloned and sequenced. The results of the clone-analysis showed significant variation in bacterial sequences found in these samples. The species-patterns could be used to evaluate the possible contamination of ambient seawater to the fluid samples. Variations in the dominant species depending on the location were found, suggesting that the bacterial community at sub-sea floor is not monotonous but has gradual shift from the hydrothermal center to peripheral area.