

Sintering on a fault during an earthquake

TONOIKE NAOYA¹, *Tetsuro Hirono¹

1. Department of Earth and Space Science, Graduate School of Science, Osaka University

Frictional heating on a fault during earthquake slip induces various phenomena such as melting, thermal decomposition, and so on. In the case of the Taiwan Chelungpu fault which slipped at the 1999 Chi-Chi earthquake, disk-shaped black material was discovered within the fault zone, and was considered as a pseudotachylite on the basis of the development of hourglass and bubble structures. However, such structures are commonly observed in ceramics. Here we demonstrated experimentally the sintering phenomenon on the synthetic and natural samples (montmorillonite, illite, and sedimentary host rock nearby the Chelungpu fault). We observed similar structure in the sample that heated at 800 C to those in the fault material. Thus, frictional heating induces not only melting but also sintering, which might affect the frictional behavior and strength recovery of a fault.

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