

Study of fault rocks by X-ray microscopy

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We have installed a new transmission X-ray microscope at beamline BL01B of the Taiwan Light Source, National Synchrotron Radiation Research Center (NSRRC). The X-ray source is a superconducting wavelength shifter operated at 5T. The X-ray microscope has been shown to provide 2D imaging and 3D tomography at energy 8-11 keV with a spatial resolution of 30-60 nm, and is equipped with the Zernike-phase contrast capability for imaging light materials such as biological specimens. Employing this X-ray microscopy, we investigate the fault rocks from the cores of the Taiwan Chelungpu-fault Drilling Project (TCDP), which drilled in the fault zone of 1999 Chi-Chi earthquake. The characterization of particle size distribution, porosity and 3D structure of the fault rocks in transition from the fault core to damage zone are related to the comminuting and fluid behaviors and energy in the earthquake faulting^[1,2,3]. The results may ascertain the implication of the nucleation, growth, transition, structure and permeability of the fault zones^[4,5,6]. Furthermore, it may be possible to infer the mechanism of physical and chemical property of the fault, and the nucleation of the earthquake.

References

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