

Fluid chemistry of the fault propagation zone ?fluid inclusion analysis from the Lishan fault, Taiwan-

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Liberation of CO₂-rich gas from fluid preserved in the fault propagation zone would be important phenomena in the earthquake and aftershock process. We have detected that injected fluid in link thrust would cause fault propagation and fault lubrication due to vapor-separation [1]. Recently, one of the authors, Yu-Chang Chan found unusual quartz vein on the great link-thrust, Lishan fault, in Taiwan orogenic belt [1]. The quartz vein is spherical shape and is composed of large crystals and surrounding milky fine-grained crystals. The transparent quartz grains contain large primary fluid inclusions over 100 microns in diameters. The fluid inclusion is classified as two phase, vapor phase and three phase inclusion. Homogenization temperature is 260 oC and NaCl wt% estimated from freezing T, is 7.41. In order to measure fluid chemistry, PIXE analysis was done at Tsukuba University. Analytical procedure is shown in [2]. The result is summarized as follows. Br/Cr ratio is lower than that in seawater. Ti, Cr, and Ni contents are high, suggesting that fluid is related to magma activity beneath the fault. Vapor-phase inclusion contains considerable amount of metal elements (Ti, Zn, Ge, Mn, Ca, Fe, Pb, Rb, and Cu) as well as K, and Br. Fractionation differences between the vapor and the fluid would be useful tool to detect vapor separation due to fault propagation.

References

- [1] Chan, Y. et al., Terra Nova 17, 439-499 (2005)
- [2] Kurosawa M. et al., Island Arc, 19, 17-29 (2010)

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