ESR, ^{226}Ra-^{210}Pb and ^{228}Ra-^{228}Th dating of barite in sea-floor hydrothermal sulfide deposits in the Okinawa Trough

TAISEI FUJIWARA[1]*, SHIN TOYODA[1], AI UCHIDA[1], JUN-ICHIRO ISHIBASHI[2], SHUN'ICHI NAKAI[3] AND ASAKO TAKAMASA[3#]

[1]Faculty of Science, Okayama University of Science, Okayama, Japan
(*corresponding author: s13pm03ft@std.ous.ac.jp)
[2]Faculty of Science, Kyushu Univ., Fukuoka, Japan
[3]Earthquake Research Institute, University of Tokyo, Tokyo, Japan
[#] Present address: National Institute of Radiological Sciences, Japan

ESR (electron spin resonance) dating method has been applied to calcite, aragonite, hydroxyapatite, quartz and gypsum. Recently it was shown that this method is also practically applicable to barite, especially those in sea-floor hydrothermal sulfide deposits (Takamasa et al., 2013).

ESR, ^{226}Ra-^{210}Pb, and ^{228}Ra-^{228}Th ages were determined for barite crystals extracted from hydrothermal sulfide deposits taken at hydrothermal fields at the Okinawa Trough. The ages range 4.1 to 16000 years where the ages obtained by the three methods coincide in some of the samples while the ^{228}Ra-^{228}Th ages are the youngest and ESR ages, the oldest and the ^{226}Ra-^{210}Pb ages in between in the other samples. The samples with younger ESR ages show younger ^{226}Ra-^{210}Pb ages and those with older ESR ages show older ^{226}Ra-^{210}Pb ages with no detection of ^{228}Ra. The inconsistency of the ages between these methods would be explained by the mixture of the barite crystals with younger and older ages, formed by several hydrothermal activities. The order of ages of the 5 hydrothermal fields would be arranged, from young to old as follows; Yoron Hole field, Daiyon-Yonaguni Knoll field, Hatoma Knoll field, being nearly equal to Iheya North Knoll field.