Glauconite in fault fracture zone of Kannawa Reverse Fault at Hitotoo, Yamakita-machi, Kanagawa Prefecture, Japan

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Glauconite is a member of dioctahedral micas (Rieder et al, 1998) with the theoretical formula K(Fe^{3+},Mg,Fe^{2+},Al)$_2$[(OH)$_2$| (Si,Al)$_4$O$_{10}$]) where (Fe^{3+} Mg, Fe^{2+}, Al; [Si Al]), and the occurrence is known extensively as cementing material in iron-rich sandstone. Recently it is found in basalts as the product of hydrothermal alteration (D'Antoniol and Kristensen, 2005; Ionescu et al., 2006).

The present glauconite is found in a hematite-quartz rock of Hondanigawa Formation belonging to Tanzawa Group, exposed in an outcrop of Kannawa Reverse Fault located at the left side of the River Minase, one of the branches of the River Sakawa. It is located about 2.5 NNW of Yamakita Station of Gotemba Line, JR.

The hematite-quartz rock is dark red sedimentary rock looking like a mudstone overlying an acidic pyroclastic rock comprising aluminoceladonite and magnetite. The boundary of hematite- quartz rock against the acidic pyroclastic rock is rather clear although the rock is considerably distorted after the effect of Kannawa Reveres Fault. Under the microscope, it is a fine-grained sandstone composed of round quartz grains interstitially cemented by hematite. Glauconite is found as lustrous and dark green, thin and intermittent platelets of sub-millimeter thick, developed along minute fractures parallel to the boundary to the pyroclastic rock, or as minute undistorted spherules of about 0.n mm order across, the size being nearly same as that of the adjacent quartz grains. Seeing from the traces of cleavage of glauconite, the individual aggregates are composed of distorted single crystals in both.

The chemical analysis using energy-dispersive X-ray microanalyser on the material forming the intermittent layer gives SiO_2 49.99, Al_2O_3 4.46, FeO 23.32, MgO 4.16, CaO 0.44, Na_2O tr., K_2O 8.65, total 91.02%. The empirical formula is calculated after three steps: firstly, total Fe + Mg + Al + Si = 6; secondly total positive charge = 22, where a considerable part of Fe is converted into Fe^{3+}, yielding Fe_2O_3 23.49, FeO 2.18, and revised total 93.37%; thirdly the rest is ascribed to H_2O. The result is: $K_{0.82}Ca_{0.04})_{0.86}(Fe^{3+}{}_{1.31}Mg_{0.46}Fe^{2+}{}_{0.14}Al_{0.10})_{2.01}[(OH)_2|(Si_{3.71}Al_{0.29})_{4.00}O_{10}]0.64H_2O$, where a part of Al is placed in the tetrahedral site, satisfying the above ideal formula.

Since all the Japanese glauconites in sedimentary rocks occur as aggregates of very minute tablets and is handled as a diagenetic product. As compared with these materials, the grain size of the present glauconite is significantly large. Since the locality is included within the area of zeolite facies regional metamorphism (Seki et al, 1969), the hematite-quartz rock comprising glauconite had suffered from metamorphism of such grade, leading to the conclusion that the glauconite may be the metamorphic product at least in part and/or the later alteration.