

Chemical composition and classification of frutexites in Alwa Formation, Oman mountains, northern Oman

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The frutexites, showing irregular shrub structure, which was described as a microrstromatolites induced by microbial activity by Maslov (1960). The structure with microlayering is interpreted to be formed by microbiotic activity with deposition of Fe and Mn minerals (Jakubowicz et al., 2014). The frutexites were reported from the Lower Triassic Alwa Formation, which is distributed in the southeastern part of the Oman Mountains (Woods and Baud, 2009). This formation consist mainly of red colored carbonate including peloidal wakestones and perodial packstones. The frutexites is occurred from the remarkable black colored carbonate, which is called as sheet crack by Woods and Baud (2009) and is filled by submarine cement in the Alwa Formation. This black colored carbonate encrusts the wall-rock surface of sheet crack. In this study, we aim to describe the microstructure and chemical composition of this frutexites on the basis of microscopic observation and chemical analysis using EDS.

The predominant feature of the frutexites in the Alwa Formation exhibits 0.1-1.5mm long shrub structure consisting of microlayering by Fe-Mn rich carbonate minerals. Under microscope, two distinct layers showing orange and white colors are recognized and the latter is developed in outer marginal layer of the shrub structure of these carbonate microlayers. In addition, the black color shrubs, which are 0.1-0.5mm long and lack to orange colored layers, are also observed in the black carbonate.

The EDS analysis, using JSM-6510A in Shinshu University, shows the compositional difference of the micro layers of these frutexites. The orange and white colored microlayers of frutexites contain Mg, Fe, Mn as a carbonate component, whereas Al and P concentrates in the black colored microlayers. Thus, the frutexites in the Alwa Formation is classified by two types; Mg-Fe-Mn rich and Al-P rich types. The shrub structure grew as a result of mineralization by microbial activity under fluctuating conditions (Jakubowicz et al., 2014). Thus, this compositional differences and variety of frutexites is possibly related to the microbial activity and bottom water condition during their growth stage.

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