[EJ] Evening Poster | S (Solid Earth Sciences) | S-RD Resources, Mineral Deposit & Resource Exploration

[S-RD33]Resource Geology

convener:Tsubasa Otake(Division of Sustainable Resources Engineering, Faculty of Engineering, Hokkaido University), Daisuke Araoka(Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology), Ryohei Takahashi(秋田大学大学院国際資源学研究科, 共同), Tatsuo Nozaki(Research and Development Center for Submarine Resources, Japan Agency for Marine-Earth Science and Technology)

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Ore deposits consisting of supracrustal concentrated valuable elements and minerals result from the Earth's dynamics including magmatism, hydrothermal activity, metamorphism, and weathering. The formation of ore deposits is also closely associated with global environmental changes and biological evolution in the Earth's history. Involvement of different academic fields in Earth Science including Geology, Petrology, Mineralogy, and Microbiology is required to understand the genesis of ore deposits. The filed of Resource Geology is essential not only for efficient exploration and development of ore deposits but also for better understanding and assessment of hazardous elements that may be caused by resources development. This session widely covers various topics of field investigation and observation, laboratory experiments, theoretical calculation, development of analytical methods and others related to the supracrustal migration and concentration of elements.

[SRD33-P01]Geochemical behavior of gold in Nansatsu-type gold deposits

*Mizuki Ishida[1], Shumpei Murakami[1], Kazutaka Yasukawa[1,2], Kentaro Nakamura[1], Koichiro Fujinaga[2,3], Yasuhiro Kato[1,2,3,4] (1.Department of Systems Innovation, School of Engineering, The University of Tokyo, 2.Ocean Resources Research Center for Next Generation, Chiba Institute of Technology, 3.Frontier Research Center for Energy and Resources, School of Engineering, The University of Tokyo, 4.Research and Development Center for Submarine Resources, Japan Agency for Marine-Earth Science and Technology (JAMSTEC))

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Gold (Au) is one of the most important metals in our society, used not only in making jewelry and financial transactions but also in various electronic devices and aerospace technology. Au generally occurs as an ore-forming mineral of hydrothermal deposits [1]. The Nansatsu-type gold deposits in the southern area of Kagoshima, Kyusyu, on which this study focuses, are the representative hydrothermal gold deposits in Japan.

In order to explore undiscovered gold deposits, understanding of the formation mechanism of high-grade hydrothermal gold deposits is important. In this respect, elucidation of the behavior of Au during the formation of gold deposit constitutes a key constraint. However, the behavior of Au on the formation of hydrothermal deposits has not been fully understood. This is partly because the concentration of Au in the ore and ore-forming fluid is significantly lower compared to those of the major elements such as Fe and Cu.

In this study, therefore, we conducted multi-trace element analysis (including Au) of the ore samples collected from the Kasuga and Akeshi deposits by using ICP-MS. As a result, we found out that the sulfide (mostly pyrite) samples from the Akeshi and Kasuga deposits can clearly be divided into two groups by their composition: higher As group (> 200 ppm) and lower As group (< 100 ppm). The samples of the higher As group show strong positive correlations between Au and As (r=0.99) and between Au and Pb (r=0.87). In contrast, the samples of the lower As group show no clear correlation among Au, Pb and As contents.

Instead, the Au content of these sulfide samples correlates well with Cu (r=0.67) and Co (r=0.75). These results imply that the elements associated with Au are different in the two groups. The contrasting geochemical features in the two groups of sulfide minerals might suggest that two hydrothermal fluids that had distinct chemical composition were involved in the Au-mineralization in the Nansatsu-type gold deposits.

[1] Mariko, T (2008) Geology of Ore Deposits. Kokin-Shoin, Tokyo, 580 p (in Japanese)