[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)

Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

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-P06]What is recorded in Mg isotopes of carbonate-hosted REE deposit?

*Daisuke Araoka[1], Toshihiro Yoshimura[2], Mihoko Hoshino[1], Yoshiaki Kon[1], Shinsuke Kodama[1], George J. Simandl[3,4], Suzanne Paradis[5], Craig Green[3] (1.Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology, 2.Japan Agency for Marine-Earth Science and Technology, 3.University of Victoria, 4.British Columbia Geological Survey, 5.Geological Survey of Canada)

Keywords:Mg isotope, REE deposit, carbonate

Recently, Mg isotopes in natural samples have been widely used for investigating various geochemical and biological processes because the large mass differences between the isotopes of Mg (8%, ^{24}Mg and ^{26}Mg) result in large isotopic variations in natural systems. Because Mg are fluid-mobile and one of the major elements in the Earth’s surface, its stable isotopic compositions in rocks and minerals are useful for deciphering fluid/melt–rock interactions in the Earth’s surface systems. Especially, carbonate-hosted deposits such as carbonatite-related rare earth element (REE) deposit and Mississippi Valley-type Zn-Pb deposit are economically important and have been developed all over the world as main REE and Zn-Pb resources, respectively. These backgrounds indicate that Mg and its isotopes, one of the major elements in the deposits, are expected to be a good tool for constraining ore genesis of these kind of deposits. Moreover, large Mg isotopic differences between igneous rocks and biogenic carbonate such as coral and foraminifera may be useful to quantify rate of their Mg contribution to the deposits. Condition of dolomitazation before mineralization (e.g. dolomitazation temperature and source of Mg in dolomite) is also likely to be estimated by Mg isotopic studies in the deposits. Therefore, as a case study, we investigated the Rock Canyon Creek (RCC) REE-fluorite deposit, one of the carbonate-hosted REE deposits in British Columbia, Canada.

In the British Columbia alkaline province, 43 REE occurrences have been reported, which consists of carbonatites, nepheline and sodalite syenites, ijolite series rocks, kimberlite, and many ultramafic and

lamprophyre diatremes, breccias, and dikes. Among 43 REE occurrences, the RCC REE-fluorite deposit is one of the most promising REE prospects in British Columbia. The RCC REE-fluorite deposit is hosted by Middle Devonian carbonate rocks of the Cedared and Burnais formations and consists mainly of dolostone, breccia, and laminated silty, calcareous gypsum. The main REE-fluorite mineralized zone was drilled for collecting core samples of the deposit. In this study, we reported Mg isotope compositions as well as radiogenic Sr isotope compositions of separated minerals (dolomite, calcite, and fluorite) from core samples of RCC REE-fluorite deposit for evaluating what factors mainly control Mg isotope in the deposit (e.g. condition of dolomitization, Mg isotope history of seawater, and ore-forming process).