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

[S-RD33]Resource Geology

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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-P08]Petrography of hydrothermal magnetite ore and host rock of the Chandmani Uul deposit, southeast Mongolia

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Hydrothermal type magnetite deposit at the Chandmani Uul locates in Dornogovi province, southeastern Mongolia. Ore reserves of this deposit are estimated as 25 Mt of Fe with 0.1 Mt of Cu and 3 t of Au. Tectonically, the deposit locates in passive continental margin that develops north of the Undurshi fault zone, the main Mongolian lineament. Magnetite ores are hosted in Shar Zeeg formation (Neoproterozoic to Lower-Cambrian) as >50 lenticular ore bodies of 100-200 m wide with 10-30 m in thickness. Lithology of host rocks is metamorphosed dacite, dacitic tuff and andesitic tuff. Middle- to Upper-Cambrian intrusive bodies of mixed granodiorite, diorite and diorite-porphyry intruded into Shar Zeeg formation. The intrusive bodies are believed to supply ore-forming fluid. We have collected ~200 ore and rock samples from drilling cores for petrographic examination.

Volcanic rocks of Shar Zeeg formation have been intensely modified by hydrothermal alteration and deformation during intrusion of granitoids. The volcanic rocks are composed of phenocrysts (plagioclase, 10-15%) and groundmass (quartz-feldspar, 85-90%). Polysynthetic twinning of plagioclase (0.5-1.8mm) is bended during cataclase process. The groundmass shows microfelsitic texture, which is overgrown by sericite and calcite aggregates. Numerous veins of calcite, quartz and epidote cut host rocks. Fine-medium grained biotite granodiorite exhibits a massive texture and contains about 60% plagioclase, 20-25% quartz, 10-15% biotite. Pyrite, magnetite, sphene and apatite are found as accessory minerals.

Mineralization of this deposit developed to replace volcanic rocks of Shar Zeeg formation. Magnetite-hematite ore is most abundant in the deposit. Massive mushketovite (prismatic aggregate of magnetite with small amount of hematite at the rim of magnetite crystals) is the major mineral. Calcite-quartz veinlets usually

cut magnetite-hematite ore. Magnetite-chalcopyrite ore is also abundant in the deposit, and appears relatively lower level of the mine. Under ore microscope, chalcopyrite with small amount of pyrite is filled by aggregate of small magnetite grains. Hematite accompanies along grain boundary of magnetite.

Previous research suggests that this deposit is skarn-type in origin, however no skarn mineral is included in ore except small amount of garnet in association with sulfides. Limestone crops out ~2 km south of ore bodies, however no mineralization is found in this limestone. Similarity of tectonic setting and mineral assemblage of the deposit with those of world IOCG (Iron Oxide Copper Gold) deposits suggests that the origin of this deposit is IOCG type.