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Paragenetic Sequence of Sulfosalt Mineralization at Epithermal Deposits of Southwestern Hokkaido, Japan

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The Shin Otoyo, Suttsu, Teine, Date, Chitose, and Koryu are precious and base metals Miocene–Pleistocene epithermal deposits located at the southwestern Hokkaido, Japan. The deposits are dominantly hosted by green tuff formation of Middle Miocene age. The ore petrography study from those deposits shows the occurrence of various amounts of Cu–As–Sb–Ag–Bi–Pb–Te sulfosalt minerals. The determination of mineralogy and chemical compositions of sulfosalt minerals from those deposits were undertaken to provide information regarding conditions of ore formation stability fields. Various kinds of sulfosalt minerals identified from gold–silver and base metal quartz-sulfide veins were represented some sulfosalt mineralization phases, such as Cu–Fe–Sn–S phase of mawsonite and stannite; Cu–(As,Sb)–S phase of tetrahedrite–tennantite and luzonite–famatinite series minerals; (Cu,Ag)–Bi–Pb–S phase of emplectite, pavonite, friedrichite, aikinite, and lillianite–gustavite series minerals; (Ag,Cu)–(As,Sb)–S phase of proustite–pyrargyrite and pearceite–polybasite series minerals; and Bi–Te–S phase of tetradymite and kawazulite minerals. In general there are some trends in the paragenetic sequence of sulfosalt mineralization in southwestern Hokkaido (in complete or partial) as follows: sulfide → Cu–Fe–Sn–S → (Cu,Ag)–Bi–Pb–S → [Bi–Te–S] → Cu–(As,Sb)–S → [(Ag,Cu)–(As,Sb)–S]. The formation of those sulfosalt minerals were characterized by the introduction of some elements such as Sn, Bi, and Te at the earlier and the increase or decrease of some elements such as As and Sb, and followed by introduction of Ag at the later stages of ore mineral paragenesis sequence. Thermodynamic stability for the Chitose and Koryu are slightly different from those of Shin Otoyo, Suttsu, Teine, and Date because of its lack of tin and bismuth mineralization. Their variability concentrations and relationships are not simply with redistributed trace elements from the original sulfides minerals, and some heavier elements were also introduced during the replacement reaction which consistent with their occurrence of their mineral associated with.

Keywords— bismuthinite, mineralization phases, paragenetic sequence, sulfosalt minerals, tetrahedrite–tennantite series.