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AN EXAMPLE OF ALKALINE-RELATED GOLD DEPOSIT FROM RADZIMOWICE IN THE KACZAWA MTS

ABSTRACT

In the Radzimowice Au-Cu-As deposit the early uneconomic porphyry-type pyrite±arsenopyrite mineralization with strong argillitic alteration of igneous rock suites followed by economic quartz-sulfide veins with propylitic alteration are attributed to Upper Carboniferous – Lower Permian(?) potassic magmatism interpreted as the product of postcollisional arc setting (Mikulski 2002, this volume). Continous syn–mineralization uplift were responsible for superposition of epithermal low sulfidation mineralization over relics of higher temperature, deeper-seated mineralization. The multiple episodes of intrusive activity, starting by an early calc-alkaline stage followed alkaline intrusive activity with late generated multiple hydrothermal activities with final gold mineralization associated with base metal sulfides, and tellurides, are a very characteristic features common for the alkaline-related gold deposits known elsewhere.

INTRODUCTION

The Radzimowice Au-Cu-As deposit from the Kaczawa Mts. is situated in the Western Sudetes that constitute the NE part of the Bohemian Massif and is considered as a continuation of the Saxothuringian Zone of the European Variscides. The main gold-bearing ore mineralization is found in the major sixth quartz-sulfide veins that cut the Zelezniak massif built of intrusive rocks of sub-alkaline and alkaline suites of Upper Paleozoic and Lower Paleozoic sedimentary rocks of flysch character (Manecki 1965; Zimnoch 1965; Paulo and Salamon 1975; Mikulski 1999; Mikulski et al., 1999; Mikulski 2002, this volume). Additionally, intensive ore mineralization appears in the southern part of the Żeleźniak intrusive rocks as a stockworks built of monomineral sulfides or quartz-sulphide veinlets accompanied by sulfides impregnation in country rocks. Gold is associated with, base metal sulfides, Co-bearing arsenopyrite and with tellurides (Mikulski 2001).

MINERALIZATION

Several stages of ore mineralization in quartz veins are recognised, including the most important of them: pyrite-arsenopyrite stage (with invisible gold), base

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metal sulfides stage (with gold), Bi-Te-Au-Ag-Pb-S minerals stage, sulfosalt minerals stage, marcasite stage, Fe-hydroxides stage (Mikulski in press). Abundance of base metal sulfides, low an average Au:Ag ratio, low fineness of gold assay (600-720), appearence of tellurides, and position of the ore samples on the ternary diagram of Au-Ag-base metals in the field of the epithermal gold deposit, indicate for a strong low sulfidation epithermal overprint on the older mineralization of a high sulfidation character (Mikulski, 1999; Mikulski in press). Hydrothermal alteration is demonstrated especially in dacites and in the surroundings of the ore shoots (Manecki 1965; Mikulski in press). At first a strong acidic hydrothermal alteration of argillitic character (sericitization, pyritization, and kaolinitization in vein selvages) followed by alkalic hydrothermal alteration of propylitic character (illitization, chloritization) with albitization and carbonatization. Kaolinitization followed sericitization only in very narrow zone directly in contact of dacites with ore veins. Pyrite zones overprinted previous alteration and is widespread beyond. Illite concentration appears in altered rocks as veinlets and infilling spaces after biotite or plagioclase phenocrysts. Additionally, commonly appear carbonates, marcasite, Ti-oxides, Fe-hydoxides, and locally low temperature quartz, and orthoclase (adularia).

CONCLUSIONS

Gold-bearing ore mineralization in Radzimowice deposit occurs in the area of multiple episodes of intrusive activity, characterized by an early calc-alkaline stage followed by alkaline intrusive activity during Upper Carboniferous – (?)Early Permian. geochemical signatures of volcanic sequences from the Radzimowice deposit are comparable to the environment of the post-collisional, extensional settings adjacent to former active continental margins. Ore-bearing quartz veins are a part of a local (district?)-scale hydrothermal system. Strong alteration processes at first of acidic rather than alkaline nature produced mineral assemblages that are very characteristic features of the alkaline-related gold deposits. Early non-economic(?) porphyry-style with pyrite±arsenopyrite mineralization followed by economic quartz veins that exhibit a consistent mineral paragenesis, with early Fe±As sulfide mineralization, followed by base-metal sulfides, electrum-telluride-bismuth minerals and sulfosalt minerals with carbonates.

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