

Pyrite Chemistry Study at Sedimentary Formation in Banjarnegara, Indonesia: Implications for Gold Enrichment

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The occurrence of Sediment-hosted gold deposit (SHG) has not been widely explored in Indonesia, as during the last decade both government and private sectors have mainly focused on gold deposits related to volcanic systems (e.g., epithermal, porphyry, and skarn). Therefore, more detailed research on SHG deposits in Indonesia is highly necessary. The presence of dominant Pyrite in this system is closely related to gold enrichment, So it is essential to understand the chemical characteristics and distribution of Au in SHG deposits systematically. In addition, SHG deposits are often associated with the enrichment of rare earth elements. Pyrite plays an important role as a primary indicator mineral for gold mineralization due to its ability to incorporate and host trace metals within its crystal structure. This study focuses on the Banjarnegara area. The methods applied in this study include petrographic analysis, ore microscopy, X-ray diffraction (XRD), and scanning electron microscopy combined with energy-dispersive spectroscopy (SEM-EDS). Gold mineralization occurs in shale, brecciated jasperoid, and jasperoid host rocks that have undergone silicification and argillic alteration due to hydrothermal fluid interaction. The mineralization is concentrated along a NW-SE trending dextral fault, occurring as gouge within the Early-Middle Miocene Rambatan Formation. The deposit is characterized by gold-bearing pyrite, in which gold occurs as a solid solution within the pyrite crystal lattice and is associated with pathfinder element anomalies of As-Sb-Hg. Gold concentrations in pyrite is significant which range from 900 ppm to 52,300 ppm. The findings of this study are particularly significant for further investigation.