ABSTRACT

Kademangan district contains the potential mineral resources which result from the hydrothermal fluid process. It is located in Blitar Regency, East Java, Indonesia. This research aimed to understand the hydrothermal alteration, mineralization, and rock geochemistry characteristics. Surficial geology and alteration mapping methods are applied to obtain spatial geological information while the outputs were used for laboratory analyses. The laboratory analyses include Petrography, X-ray diffraction, Ore microscope, Inductively Coupled Plasma Mass Spectrometry (ICP-MS), and Fire Assay-Atomic Absorption Spectrometry (FA-AAS) method were used for interpreting the rocks unit and alteration minerals, clay minerals, ore mineralization, rock geochemistry and tectonic setting, respectively. Based on the results from field observation and laboratory analysis, the lithologies of the Kademangan district is hosted by the formation of volcanic breccia, dacite tuff, basaltic-andesite, andesite, intrusive dacite and limestone, range from older to younger rocks. The geological structures are controlled by stockwork, normal fault, dextral strike-slip fault, sinistral strike-slip fault and small veins distribute from northeast-southwest and northwest-southeast. Alteration zones indicate as advance argillic (alunite, diaspore, pyropyllite, quartz, kaolinite, illite, illite-smectite, montmorillonite, chlorite, hematite, and jarosite), argillic (illite, smectite, montmorillonite, quartz, kaolinite, chlorite, calcite and natrojarosite), and propylitic alteration zone (chlorite, calcite, sericite, quartz). Ores mineralization were characterized as pyrite, chalcopyrite, gold, galena, arsenopyrite, sphalerite and malachite which occur in vuggy quartz texture, stockwork on andesite, and disseminated, exsolution, replacement and open space filling texture in intrusive dacite. The gold grade ranges from <0.01 ppm to 0.04 ppm, while its average is 0.017 ppm. The magma affinity indicates to calc-alkaline. The tectonic setting is the subduction zone in the continental arc. In conclusion, the deposit can be categorized in high-sulfidation epithermal. The parameters control the hydrothermal alteration and mineralization are lithology and geological structures.

Keywords: Kademangan district, hydrothermal alteration, high-sulfidation epithermal, mineralization, X-ray Diffraction, rock geochemistry.

SARI

Lokasi penelitian adalah salah satu daerah prospek, yang terbentuk oleh setting tektonik dan pengaruh fluida hidrotermal yang menghasilkan potensi sumber daya mineral. Daerah penelitian terletak di kabupaten Kademangan, Kabupaten Blitar, Jawa Timur, Indonesia. Penelitian ini bertujuan untuk mengetahui alterasi, mineralisasi dan karakteristik geokimia batuan. Metode yang digunakan terdiri dari pengamatan kondisi geologi permukaan, dan pemetaan alterasi yang dikombinasikan dengan laboratorium analisis. Analisis laboratorium yang dikerjakan dalam penelitian ini berupa analisis petrografi, Difraksi Sinar X (XRD), analisis geokimia (senyawa oksida dan unsur-unsur jejak), mikroskop bijih dan Spektrometri Serapan Atom-Api (FA-AAS). Berdasarkan hasil dari pengamatan lapangan dan analisis laboratorium, litologi daerah penelitian adalah andesit, dasit, rhyodacite, breksi dan basaltik-andesit. Struktur geologi yang mengontrol daerah penelitian mempunyai tren timur laut-barat daya dan barat laut-tenggara, berupa sesar turun, sesar geser kanan dan sesar geser kiri. Sedangkan struktur mineralisasi berupa stockwork dan urat. Zona alterasi dibagi menjadi argillic advance (alunite, diaspore, pyrophyllite, quartz, kaolinite, illite, illite-smectite, montmorillonite, chlorite, hematite dan jarosite), argillic (illite, smectite, montmorillonite, kuarsa, kaolinit, klorit, kalsit dan natrojarosite) dan zona alterasi profilaksis (klorit, kalsit, serisit, kuarsa). Mineralisasi di daerah penelitian dikarakteristikkan dengan hadirnya mineral. pirit, kalkopirit, emas, galena, arsenopirit, sphalerit, dan malakit yang dijumpai pada tekstur kuarsa vuggy, stockwork pada andesit, dan batuan induk dacite yang dijumpai berupa diseminasi, exsolution, penggantian, dan tekstur open space filling. Selanjutnya, kisaran kadar emas di daerah penenlitian antara <0,01 ppm hingga 0,04 ppm, dengan rata-rata kadar emas sebesar 0,017 ppm. Afinitas magma berupa calc-alkaline. Selain itu, dari hasil interpretasi setting tektonik mengidentifikasi bahwa daerah penelitian terbentuk di zona subduksi, busur benua dan busur lautan. Menurut karakteristik di atas, endapan dapat dikategorikan dalam epitermal sulfidasi tinggi, dimana alterasi hidrotermal dan mineralisasi dikontrol oleh parameter litologi dan geologi struktural.

Kata kunci: Kabupaten Kademangan, alterasi hidrotermal, epitermal sulfidasi tinggi, mineralisasi, Difraksi sinar-X, geokimia batuan.