

Mineralogy and Fluid Inclusion Study of the Kebbouch South Pb-Zn Deposit, Northwest Tunisia

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Abstract : The Kebbouch South Pb-Zn deposit is located 20 km to the east of El Kef (NW) in the southeastern part of the Triassic diapir belt in the Tunisian Atlas. The deposit is composed of sulfide and non-sulfide zinc-lead ore bodies. The aim of this study is to provide petrographic results, mineralogy, as well as fluid inclusion data of the carbonate-hosted Pb-Zn Kebbouch South deposit. Mineralization forms two major ore types: (1) lenticular dolostones and clay breccias in the contact zone between Triassic and Upper Cretaceous strata; it consists of small-scale lenticular, strata-or fault-controlled mineralization mainly composed of marcasite, galena, sphalerite, pyrite, and (2) stratiform mineralization in the Bahloul Formation (Upper Cenomanian-Lower Turonian) consisting of framboidal and cubic pyrite, disseminated sphalerite and galena. Non-metalliferous and/or gangue minerals are represented by dolomite, calcite, celestite and quartz. Fluid inclusion petrography study has been carried out on calcite and celestite. Fluid inclusions hosted in celestite are less than 20 μm large and show two types of aqueous inclusions: monophase liquid aqueous inclusions (L), abundant and very small, generally less than 15 μm and liquid-rich two phase inclusions (L+V). The gas phase forms a mobile vapor bubble. Microthermometric analyses of (L+V) fluid inclusions for celestite indicate that the homogenization temperature ranges from 121 to 156°C, and final ice melting temperatures are in the range of -19 to -9°C corresponding to salinities of 12 to 21 wt% NaCl eq. (L+V) fluid inclusions from calcite are frequently localized along the growth zones; their homogenization temperature ranges from 96 to 164°C with final ice melting temperatures between -16 and -7°C corresponding to salinities of 9 to 19 wt% NaCl eq. According to mineralogical and fluid inclusion studies, mineralization in the Pb - Zn Kebbouch South deposit formed between 96 to 164°C with salinities ranging from 9 to 21 wt% NaCl eq. A contribution of basinal brines in the ore formation of the Kebbouch South Pb-Zn deposit is likely. The deposit is part of the family of MVT deposits associated with the salt diapir environment.

Keywords : fluid inclusion, Kebbouch South, mineralogy, MVT deposits, Pb-Zn

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