Hydrothermal Alteration Identification of Ahangaran Deposit, West of Iran Using ASTER Spectral Analysis

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Abstract

This study investigates the application of spectral image processing methods to ASTER data for mapping hydrothermal alteration zones associated with sedimentary hosted Pb-Fe Ahangaran deposit and related host rock. The study area is located in the northwestern part of the Malayer-Esfahan Metallogenic belt (MEMB) in the west of Iran. Due to high potential zone for new exploration of the sediment-hosted Pb-Fe deposits, this area has been selected for more investigation. The set of algorithms are used to extract spectral information of VNIR_SWIR and TIR data including band-ratio, band indices, spectral Angle Mapper (SAM) and Matched-Filtering (MF). Evaluation and processing of ASTER Image of the study area, aided by results of field surveying and XRD analysis, show that alteration minerals related to mineralization include dolomitic and silicic altered rocks that contain localized areas of iron oxide minerals (gossan zone). As it is apparent, the identification of the gossan zone is important in the initial stages of ore deposit exploration as an indicator of high economic-potential. Therefore, the pattern of alteration map can be used as an exploration guide for Fe-Pb mineralization similar to giant Ahangaran and Shams abad Fe-Pb deposits in the MEMB of Iran.

Keywords: ASTER, Spectral Mapping, Alteration, Pb-Fe mineralization**,** Malayer-Esfahan Metallogenic belt (MEMB)