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Virtual Dimension Analysis of Hyperspectral Imaging to Characterize a Mining Sample

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Abstract : Virtual Dimension (VD) procedure is used to analyze Hyperspectral Image (HIS) treatment-data in order to estimate the abundance of mineral components of a mining sample. Hyperspectral images coming from reflectance spectra (NIR region) are pre-treated using Standard Normal Variance (SNV) and Minimum Noise Fraction (MNF) methodologies. The endmember components are identified by the Simplex Growing Algorithm (SVG) and after adjusted to the reflectance spectra of reference-databases using Simulated Annealing (SA) methodology. The obtained abundance of minerals of the sample studied is very near to the ones obtained using XRD with a total relative error of 2%.

Keywords : hyperspectral imaging, minimum noise fraction, MNF, simplex growing algorithm, SGA, standard normal variance, SNV, virtual dimension, XRD
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