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[previous paper](#) [back to paper's list](#) [next paper](#)

Advantages of application of the backscattered electron scanning image in the determination of soil structure and soil constituents

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abstract Submicroscopic techniques can be broadly subdivided into the study of micromorphology and imaging of the arrangement of the soil particles and voids, and the microchemical analysis of soil components. In the authors opinion, one of the most promising tools in the micromorphology study of soil is the Scanning Electron Microscopy (SEM) operating in Backscattered Electron emission mode (BSE) with the auxiliary Energy Dispersive Spectrometry (EDS) as a microanalytical system. The emission of BSE is strongly related to the atomic number of the target. This allows easy localization of resin in pores and soil mineral particles. Qualitative differences of chemical nature between soil constituents are also distinguishable. The SEM-BSE micrographs have a much higher resolution compared with petrographic micrographs, this permits continued observation of soil structure from the meso and micro to the submicro scale. The polished blocks prepared for SEM-BSE study can be simultaneously examined by microanalytical techniques. Highly contrasted SEM-BSE 2-D images can be easily quantified using image analysis systems. Some examples of application of the BSE imaging in soil micromorphology is given and discussed in the work.

keywords backscattered electron scanning image, soil structure, soil components