Quantitative X-ray Powder Diffraction Analyses of Clays Using an Orienting Internal Standard and Pressed Disks of Bulk Shale Samples

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Abstract: Quantitative analysis of clay minerals by X-ray powder diffraction requires oriented clays in order to increase detection limits of the analyses. This is achieved commonly either by smear or sedimentation techniques; however, these techniques can lead to poor analytical precision when used with an internal standard because they often produce non-homogeneous internal standard—clay mineral mixtures. Compaction of bulk shale material at 8000 psi in an hydraulic press produces preferred orientations comparable to that produced by smear or sedimentation. When used with a suitable platy internal standard which provides an estimate of clay mineral preferred orientation, excellent analytical precision is achieved routinely. Several lines of experimental evidence indicate that $1-5$ μm MoS_2 is an ideal orienting internal standard for use with compaction mounts.

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