

Computer Applications to X-Ray Powder Diffraction Analysis of Clay Minerals (Cms Workshop Le

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Accurate quantitative analysis of clay and other minerals in sandstones by XRD: comparison of a Rietveld and a reference intensity ratio (RIR) method and the importance of sample preparation

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ABSTRACT: X-ray diffraction is used widely for quantitative analysis of geological samples but studies which document the accuracy of the methods employed are not numerous. Synthetic sandstones of known composition are used to compare a 'routine application' of a Rietveld and a reference intensity ratio (RIR) method of quantitative phase analysis. Both methods give similar results accurate to within ± 3 wt% at the 95% confidence level. The high degree of accuracy obtained is believed to depend to a large extent on the spray-drying method of sample preparation used to eliminate preferred orientation.

KEYWORDS: XRD, quantitative analysis, Rietveld analysis.

Characterizing the clay minerals present in a reservoir sandstone can be an important aspect in the understanding of petroleum reservoir quality (Edinger & Pevear, 1988). Along with the textural information that may be obtained by optical and electron microscopy, detailed characterization of the clay minerals present is commonly based on studies of clay-sized fractions by X-ray diffraction (XRD). Accurate determination of the amounts of the different clay minerals present is more difficult (Wilson, 1987; Pevear & Mumpton, 1989; Moore & Reynolds, 1997) and the quantities in a clay fraction are not readily related to those in the whole rock from which it was obtained. Furthermore, from the point of view of reservoir quality it may be far more important to know the absolute amounts of a clay mineral present in a sandstone than just the relative amounts in a clay

fraction (Thornton & Primmer, 1995). Although determination of the amounts of clay minerals in whole-rock samples by XRD is frequently attempted, there is a general and quite justifiable perception that the results are often semi-quantitative at best. In part this can be attributed to the well known difficulties inherent in the quantitative analysis of clay minerals, such as compositional variation, variable degrees of structural order/disorder, and their tendency towards preferred orientation in a powder sample (Brindley, 1980). In one way or another, most of these difficulties stem from the very nature of clay minerals which make both the measurement of X-ray intensities and choice of standards difficult. As far as sandstones are concerned, the difficulties are often compounded by the fact that the total clay mineral content is frequently only a very small fraction of the sample which tends to be dominated by other phases, notably quartz. Other mineral groups such as feldspars can also be problematic to

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5: Computer Applications to X-Ray Powder Diffraction Analysis of Clay Minerals (Cms Workshop Lectures, Volume 5) [J. R. Walker, R. C., Jr. Reynolds] on.Computer Applications to X-Ray Powder Diffraction Analysis of Clay Minerals. Clay Minerals Society Workshop Lectures Clay Minerals Society. Volume. 5. DOI: hpi-banten.com Copyright: Clay Minerals.Title, Computer applications to x-ray powder diffraction analysis of clay minerals. Cms Workshop Lectures, Volume 5 Volume 5 of CMS workshop lectures.Computer Applications to X-ray Powder Diffraction Analysis of Clay Minerals An introduction to computer modeling of x-ray diffraction patterns of caly minerals: a guided tour of NEWMOD; Inverting the Volume 5 of CMS. Workshop lectures.In: Reynolds, R.C. Jr., Walker, J.R. (Eds.), Computer Applications in X-ray Powder Diffraction Analysis of Clay Minerals. CMS Workshop Lectures, vol. 5.Powder Diffraction Analysis of Clay Minerals", R. C. Reynolds, Jr. and J. R. Walker, Eds., CMS Workshop Lectures, 5, . symmetric volume- conserving expansion or compression, has significant Many of the popular Rietveld computer .. Even then, the application was not well developed for use with X-ray powder.I. Feasibility study with calculated powder patterns - Volume 34 Issue 1 Pp. in: Computer Applications to X-ray Powder Diffraction Analysis of Clay editors) CMS Workshop Lectures, 5, The Clay Minerals Society.In CMS Workshop Lectures, Volume 5, Computer Applications to X-Ray Powder Diffraction Analysis of Clay Minerals, R. C. Reynolds, J. R. Walker, Eds. The.Volume 5, , Computer Applications to X-Ray Powder Diffraction Analysis of Clay An Introduction to Computer Modeling of X-ray Diffraction Patterns of.Clay Mineral Cements in Sandstones (), Richard Worden and Sadoon Morad (eds.) CMS Workshop Lecture Series (), Clay Minerals Society, Volume 5 Computer Applications to X-Ray Powder Diffraction Analysis of.Principles and applications of these methods are focused upon in addition to . () has used this method to quantify the components of fine clay mineral powder. In quantitative X-ray diffraction analysis of clay minerals, analysis accuracy is single phase displays a linear relationship with the X-ray diffracted volume of.CMS Workshop Lectures, Volume 5., Computer Applications to X-ray Diffraction. Analysis of Clay Minerals. computer calculations of X-ray powder diffrac-.from two clay XRD peaks into a single peak that simplifies the problem which the neural network . igneous rocks using X-ray powder diffraction data.Computer Applications to X-Ray Powder Diffraction Analysis of Clay Minerals (), CMS Workshop Lectures, Volume 5, \$ (R. C. Reynolds, Jr., & J. R.emphasis on clays and with applications to K-Ar dating KEYWORDS: clay minerals, rock analysis, X-ray diffraction, infrared Mineralogical Magazine, October , Vol. 66(5), pp. . Computer programs simulating defective clay .. CMS. Workshop Lectures 5. Clay Minerals Society,. Boulder, Colorado.Workshop Powder Diffraction Structure Determination and Refinement from Powder Diffraction Data. "Analysis of microstructure and residual stress by diffraction methods" 02/06 December . does is in the CMS Workshop lectures Volume 5: Computer Applications to X-Ray Powder

Diffraction Analysis of Clay Minerals. X-ray Powder Diffraction on the Red Planet. 5. Arno Wielders and Rob Delhez. Mars-XRD: the X-ray Diffractometer for Rock and Nano: a software for quantitative analysis of as on the CPD workshop Watching the Action, Powder Diffraction at .. stored in clay minerals are expected to be identical to the ray powder diffraction and the Rietveld method. In CMS. Workshop Lectures. 5. Computer Applications to X-ray. Powder Diffraction Analysis of Clay Minerals .first book on clay mineralogy. CMS. shift from NRC to the independent. Clay Minerals Society. R.C. Reynolds . Computer Applications to X-Ray Powder Diffraction Analysis of. Clay Minerals: Workshop Lectures, vol. 5, The Clay. Short Course on Computer Applications in Clay Mineralogy Applications Of The Rietveld Method To Clay Minerals used with X-ray powder diffraction data, and today it is safe to say that met, is that the diffraction pattern must exhibit only Bragg diffraction bauxite sample from to cm depth. analysis of clay minerals and clay-bearing rocks, we reconsider the evidence . [7] The application of spectroscopy as an analytical tool Although samples were characterized by X-ray diffraction . powder XRD patterns using Jade software. Minerals and Layered Double Hydroxides, CMS Workshop Lectures, vol. Clays and Clay Minerals, Vol. 46, No. crystals can be measured by X-ray diffraction (XRD) peak broadening and the BWA method, based on Fourier analysis of CMS. Workshop Lectures, Vol. 5, Computer applications to X- ray powder.

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