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X-Ray Analytical Methods in Geology

Jonathan Wilkins (X-Ray Mineral Services)

12th January 2021 | Zoom Video Conference | 6:30pm start

Abstract:

The need for timely analysis of rock materials has led over the last century to a highly-developed set of laboratory techniques for understanding the make-up of samples retrieved from the Earth – or extra-terrestrial bodies. Different methods will be required where intact samples are required for analysis, but the most rapid drilling will only return cuttings. XRD is particularly good when working on fine-grained materials which are not easily appraised and is the method of choice when working with clays. Clay minerals are frequently the determinant of the properties of rocks, particularly in hydrogeology, petroleum engineering, building materials and in the geotechnical field. Clays are also important industrial minerals for their use in bricks, tiles and ceramics.



XRD depends upon the fundamental properties of crystals and will return unique identification of minerals which are polytypes (e.g. example calcite/aragonite/vaterite) or essentially iso-chemical (e.g. anhydrite, bassanite, gypsum). XRF is all about atoms and quantum chemistry and is a rapid, accurate method for determining the chemical analysis of rocks and other material. The chemical analysis is frequently used as a proxy for a range of properties which may be important for quality control, petrology, contaminants, mining and exploration. Miniaturisation has made high-resolution chemical maps of surfaces possible, and X-ray methods have become mobile for use on-site, but with important caveats regarding calibration and sample presentation.

About the Speakers:

Jonathan has worked for X-ray Mineral Services Ltd. since 2002. His main responsibilities include analysis for XRD and XRF customers, quality control and unconventional projects. Jonathan's experience includes over 13 years of technical support and customer training within the wireline logging industry, including nuclear and electrical logs and structural



interpretation from acoustic and optical image logs. At MSc level his principal interest was in hard rocks, with a focus on analytical methods (XRD, XRF and Electron Microprobe), petrology and mineral

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relationships. He also makes petrographic sections in his home workshop and conducts research into pet projects relating to petrology and mineralogy encountered through field-work.

Jonathan is a member of the British Crystallographic Association and is a regular delegate at their Industry Group meetings. He is also a Fellow of the Geological Society, member of the Geologists' Association and founder-chairman of the North Wales Geology Association.

Forthcoming Talks:

DATE	TITLE	SPEAKER	VENUE
Tuesday 12 th January 2021	X-ray analytical methods in Geology	Jonathan Wilkins (<i>X-ray Mineral Services Ltd</i>)	Zoom Video Conference
Tuesday 9 th February 2021	The assessment of landslide hazard and risk, using UK and Hong Kong examples	Steve Parry (<i>Parry Engineering Geological Services</i>)	Zoom Video Conference
Tuesday 9 th March 2021	Mercia Mudstone, Salt and Gypsum	Adrian Collings (<i>Arup</i>)	Zoom Video Conference
Tuesday 13 th April 2021	Cold Supraglacial Volcanic Deposits and their effects on Glacial Ablation	Dr Laura Hobbs (<i>Lancaster University</i>)	Zoom Video Conference

The WMRG is constantly on the lookout for fascinating talks. If you would like to present, or know someone who is willing, Please contact the WMRG committee (details below) and we will try our very best to accommodate your requests.

In line with the thematic year programme, 2021 will be the Geological Society's Year of Space. The Year of Space will see the Society direct its gaze upwards and outwards, beyond the earth beneath our feet, towards the lesser explored corners of our universe. Space science seeks to answer some of life's biggest questions – why are we here, how did life evolve, and are we alone?



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