



The Clay Minerals Society

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THE PRESIDENT'S CORNER



Douglas K. McCarty

The Clay Minerals Society is the home of the Reynolds Cup, a contest in quantitative phase analysis of clay-bearing rocks (<http://www.clays.org/Reynolds.html>). Recently, Raven and Self (2017) described the practical need for accurate analysis of clay-bearing rocks and the increased demand by commercial, academic, and government laboratories.

The Reynolds Cup (McCarty 2002; Kleeberg 2005; Omatoso et al. 2006; Raven and Self 2017) was named in honor of pioneering clay scientist Robert C. (Bob) Reynolds Jr. for his enormous contributions to the field, including the first published calculation of the complete diffraction pattern from a mixed-layered clay structure (Reynolds 1967). There have been seven contests over 12 years that have analyzed 21 different synthetic mixtures of known composition made from homogenized pure mineral components that closely resemble natural assemblages.

Over 448 individuals and groups from more than 25 countries participated in the competition (Raven and Self 2017). The ~14,000 analyses completed in the contest chronicle the level of accuracy possible, and demonstrate a wide distribution of quantitative phase analysis (QPA) values for the same sample made by the different analysts. One lesson learned is that the sample preparation and the experience of the analyst are most important in obtaining accurate QPA for mineral identification and quantification. X-ray diffraction is by far the most commonly used method, and often the same commercial analytical software programs were used by the top and bottom finishers of every contest. The top three placements have been shared by only 11 participants (Raven and Self 2017).

Clearly, the Reynolds Cup has raised the bar of QPA accuracy by showing what is possible, and highlights the difficulty in obtaining accurate results. Few if any commercial laboratories, which may charge clients hundreds of dollars for a single analysis, provide accurate QPA values. If you are considering getting a mineral analysis of a clay-bearing sample from any type of laboratory, and where accuracy is important, simply ask the lab where they have placed in the Reynolds Cup.

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Kleeberg R (2005) Results of the second Reynolds Cup contest in quantitative mineral analysis. *International Union of Crystallography, Commission on Powder Diffraction, Newsletter* 30: 22-24

McCarty DK (2002) Quantitative mineral analysis of clay-bearing mixtures: the "Reynolds Cup" contest. *International Union of Crystallography, Commission on Powder Diffraction, Newsletter* 27: 12-16

Omatoso O, McCarty DK, Hillier S, Kleeberg R (2006) Some successful approaches to quantitative mineral analysis as revealed by the 3rd Reynolds Cup contest. *Clays and Clay Minerals* 54: 748-760

Raven MD, Self PG (2017) Outcomes of 12 years of the Reynolds Cup quantitative mineral analysis round robin. *Clays and Clay Minerals* 65: 122-134

Reynolds RC (1967) Interstratified clay systems: calculation of the total one-dimensional diffraction function. *American Mineralogist* 52: 661-673

CMS MEMBERSHIP RENEWAL

Don't forget to renew your membership for 2018!

2017 CMS PROFESSIONAL AWARD RECIPIENT SPOTLIGHT



Sridhar Komarneni

The 2017 George W. Brindley Clay Science Lecture Award was presented to Dr. Sridhar Komarneni at the 54th CMS Annual Meeting in Edmonton, Alberta (Canada) in June. Sridhar Komarneni is a Distinguished Professor of Clay Mineralogy in the Department of Ecosystem Science and Management and Materials Research Institute at the Pennsylvania State University (USA). He conducts research on both basic and applied aspects of clay mineralogy, including the study of nanostructures of clays using solid-state nuclear magnetic resonance spectroscopy. The applied aspects of his research involve the development of clays and related minerals for slow-release fertilizers and for selective uptake of hazardous non-radioactive and radioactive ions, the latter being useful for the remediation of contaminated soils and water.

He has published more than 630 refereed papers, including 5 in *Nature* and 3 in *Science*, and received 10 patents. He has written or edited 11 books and has received numerous awards, including being elected Fellow to 5 scientific societies, namely: the Royal Society of Chemistry, the American Ceramic Society, the Soil Science Society of America, the American Society of Agronomy, and the American Association for the Advancement of Science. He was also elected to the European Academy of Sciences and the World Academy of Ceramics. He is a Distinguished Member of the Clay Minerals Society. He was recognized as a Highly Cited Researcher in the Institute for Scientific Information's Materials Field section in 2002. His current total citations are about 15,000 and his h-index (Hirsch Index, a measurement of a scientist's personal impact on his field) is 62. He serves as Editor-in-Chief of the *Journal of Porous Materials* and of *Materials Research Innovations*. He also serves on the editorial boards of *Applied Clay Science* and *Ceramics International*.

STUDENT RESEARCH SPOTLIGHT

Congratulations to **Timothy Henderson** (Purdue University, Indiana, USA) for winning a 2018 CMS Student Research Grant!



Timothy Henderson

Timothy Henderson characterizes mature oil field reservoirs within the Illinois basin as part of a larger chemical-enhanced oil recovery project. Using an integrated methodology that includes field mapping, sedimentology, petrography, quantitative X-ray diffraction, scanning electron microscopy, Fourier transform infrared spectroscopy, and thermogravimetric analysis-evolved gas analysis, he is building a 3-D geologic framework that explains the physical and chemical parameters of sandstone reservoir targets in order to rejuvenate oil recovery. Sandstone reservoir samples are analyzed with respect to mineralogy and oil saturation to better understand how different mineral constituents affect flow parameters, such as porosity and permeability, but also how they will interact with injected surfactant-polymer combinations.

2018 CMS AWARDS AND GRANTS

The CMS is accepting nominations for its 2018 awards. All 2018 award nominations, professional awards, as well as student travel grants and student research grants, should be submitted by 5 February 2018.

See the CMS website for the description of the different awards and for an overview of the nomination process: <http://www.clays.org/>