

BOOK REVIEW

2001. A Clay Odyssey, Proceedings of the 12th International Clay Conference, Bahia Blanca, Argentina, July 2001, edited by Eduardo A. Domínguez, Graciela R. Mas and Fernanda Cravero. Elsevier, Amsterdam, The Netherlands, 2003; xiii + 659 pages. [ISBN: 0-444-50945-3]. Price: \$200.

The 12th International Clay Conference of the Association Internationale pour l'Etude des Argiles (AIPEA) was held at Universidad Nacional del Sur, Bahia Blanca from July 22–28, 2001. During this conference 235 oral and poster papers were presented and this publication contains 85 of those papers. The proceedings are organized under seven themes, namely, Special Lectures and Keynotes, Clay in Geology, Soil Mineralogy, Applied Clay Science, Mineral Structure and Investigation Methods, Teaching Soil Mineralogy and International Symposium on Activated Clays. Most of the papers are eight pages long including figures, tables and references.

Section I (Special Lectures and Keynotes) consists of four papers presented by the invited speakers at the conference. Haydn Murray provides an overview of the industrial application of kaolins, smectites, palygorskite, sepiolite and some other clays. The paper highlights the importance of the fundamental knowledge of the structure and composition of clay minerals for their industrial applications. R. R. Andreis describes sedimentary deposits and their clay mineralogy over crystalline rocks in the Tandilla System in Buenos Aires Province of Argentina. M. Dondi covers the recent advances in technology of tile making and compositional requirements of clay minerals for making tiles. He observes that there is an increase in demand for low-Fe and low-Ti ball clays in porcelain stoneware and stresses the need for new treatments to lower the Fe and Ti contents of ball clays. G.J. Churchman and C. Volzone show the importance of clays in the environmental context using the examples of two activated clays to adsorb organic compounds and gases. They also discuss some other applications including the effects of exchangeable Na on the protein adsorption capacity of smectites and the use of activated clays with long-chain quaternary alkylammonium cations to adsorb non-ionic organic compounds.

Section II (Clays in Geology) has 19 papers mostly from South America. The topics covered in this section include the properties of bentonites in Argentina and other South American countries, the mineralogy and construction problems in volcanic soils of southwestern

Washington, USA, the neoformation of clay minerals in acid-weathering systems of sedimentary and volcanic origins, and fluvial sediments, the application of geochemistry of clays for the characterization of raw materials for use in ceramics in Portugal and the use of mineralogical composition for lithostratigraphic classification of Tertiary sediments in Portugal. There is a short paper on the characterization of Cr-bearing chlorite using analytical electron microscopy. Other submissions from Argentina in this section include mineralogical studies of hydrothermal clay deposits in the south-east of Tandilla, and of the Campana Mahuida porphyry Cu deposits, the geochemistry of hydrothermal kaolins in Río Negro Province and the chlorite-smectite geothermometry of two exploration wells. There is a paper that describes surface microtopography of pyrophyllites from eight locations in Japan, Korea, Russia and USA but the electron micrographs cited in the text are missing. The paper on diagenetic transformation of the Pleistocene volcanogenic depositional sequence of Mexican Basin is interesting. The authors identified a dioctahedral smectite, a 7 Å mineral and a mixed-layer mineral consisting of smectite and 7 Å mineral in the volcanic sequence. M.D. Ruiz Cruz and E. Galán report the presence of berthierine in spots in slates from southern Spain and they suggest mineral genesis took place during a thermal metamorphic process. There are two good papers that apply clay mineralogical analyses for the reconstruction of coastal environments in Greece and the identification of lithofacies in Brazil. K. Wagner describes the effect of deformation on illite crystallite sizes in samples from two sedimentary basins in the West of Ireland. She proposed that increases in MacEwan crystallites might be due to 'deformation-enhanced syntectonic recrystallisation' and increases in fundamental particle sizes possibly caused by 'dislocation which migrated and thus annealed sub-grains developed in mica crystals'. My favorite paper in this section is a study of the mineralogical and geochemical properties of color-banded rhythmites in marine sediments (Leda Clay). The color-banded rhythmites formed of alternating blue-gray and reddish-gray silt-clay sediments do not vary significantly in grain size, major mineralogy and Fe chemistry. Mössbauer spectroscopy results show that the red band contains more hematite and only traces of magnetite occur in the gray band, and magnetite is absent in the red band. The ferric/ferrous ratio is dramatically different, being much larger in the red bands than in the gray bands. The authors (J.B. Percival *et al.*) postulate that different

color cores represent extreme redox environments in the sediments.

There are six papers in Section III (Soil Mineralogy) which reflects the current status of soil mineralogy world wide. Blanco and co-authors report the mineralogy of clay and silt fractions in soils developed on loess and alluvial parent materials. Most of the minerals are inherited from parent materials and they observed some transformation of illite and chlorite into inter-layered clay minerals. There is an interesting paper that reports the occurrence of allophane, imogolite and gibbsite in dunal soils from central coast of Oregon, USA. Pedologists will find papers on the occurrence of thick illuvial clay in the Santa Barbara region of California and pedogenic mineral formation in a paleosequence in southwest Germany stimulating. The paper by J.K. Torrance and J.B. Percival highlights the deficiency of the selective extraction methods for removing iron oxides from marine sediments. A presentation on transformation of feldspar into tubular halloysite, and halloysite into kaolinite in podzols of the Southern Black Forest of Germany is interesting, considering that such transformations have previously only been reported in soils from tropics and subtropics.

Section IV (Applied Clay Science) covers a diverse range of topics and there are 19 papers in this section. There are a number of papers on environmental applications of clays or environment-related topics such as removal of Pb from wastewaters, pore-lining chlorites in hydrocarbon reservoirs, mechano-chemical activation of kaolinite, application of bentonite and organo-clays in stabilization/solidification of tannery waste, adsorption of phenols by clays and transformation of chlorinated aliphatic compounds by Fe-rich smectites. Similarly, there are several papers on the characterization of industrially important clay minerals including bentonites, kaolin and palygorskite and a review on industrial clays in Brazil. The importance of clays in pottery and brick industries is reflected in contributions on the clay mineralogy of raw materials and ancient pottery from Argentina, plasticity of brick clays from Italy and crack evaluation in sintered clays. There are a couple of papers which in my opinion are misplaced in this section. The first describes the structural disorders in Brazilian kaolinites as determined by X-ray diffraction. The other reports the occurrence of corrensites in carbonates in two basins, one each in Argentina and the USA. The mineral was found at the same stratigraphic level in both basins. However, the two corrensites have different properties and the authors speculate that the mineral can potentially be used as an indicator of conditions of deposition and diagenesis.

Section V (Mineral Structure and Investigation Methods – Crystal Chemistry) is the largest section in the proceedings and it contains 22 presentations. There are a few papers which should have been included in other sections such as a study on the distribution and

forms of Fe and Al in some Argentinian soils, clay mineralogy and tensile strength of soils from Argentina and adsorption of quinoline on palygorskite and sepiolite. There are several interesting papers on synthetic minerals such as synthesis and characterization of inorganic/organic hybrid materials, ultra-thin dye-clay films, montmorillonites, boehmite and Cu- and Zn-substituted kaolinites. Papers on the application of techniques include the application of electron optical methods to study the thermal transformation of bayerite nordstrandite, and gibbsite, the EPR characterization of Fe in clay minerals, synchrotron XRD to study swelling in Na-fluorohectorite and metal-substituted kaolinites, Mössbauer spectroscopy of micas and vermiculites, thermogravimetric analysis-mass spectrometry of hydrotalcites, spectroscopic analysis of a trioctahedral mica, zinnwaldite and the EXAFS characterization of Si-Al-Mg and Si-Al-Zn montmorillonites, and Cu- and Zn-substituted kaolinites.

There are four papers in Section VI (Mineral Structure and Investigation Methods – Methods). Frost and co-workers describe the differences in formamide-adsorbed and formamide-intercalated kaolinites using controlled-rate thermal analysis, XRD, DRIFT and Raman spectroscopies. A paper on the application of cathodoluminescence of kaolin-serpentine group minerals reveals that all dioctahedral minerals exhibit a deep-blue cathodoluminescence at ~400 nm and thus could be used for their identification. Ruan *et al.* demonstrate the advantage of FTIR photoacoustic spectroscopy to determine the behavior of hydroxyls near crystal surfaces of kaolinite and gibbsite. In another paper, Ruan and co-workers have reported the results of a study on FT Raman spectroscopy and SEM of Al oxides and hydroxides.

The three papers on Teaching Clay Mineralogy (Section VI) cover the colloidal properties of clay minerals, the adsorption of organic pollutants by clay minerals and the interaction between clay minerals and microbes. The presentation on the impact of clay minerals on the behavior of organic pollutants is particularly interesting, considering the increasing environmental application of clay minerals.

There are 11 papers in Section VII which were presented at a special symposium on activated clays. These papers further emphasize the environmental use of clay minerals. The papers include the acid activation bleaching capacity of bentonites, pillared montmorillonites, and adsorption of contaminants by altered tuffaceous materials and clay-Fe oxide composites.

On the whole, this is a useful compilation of research on clays in various fields and the editors are to be congratulated for an excellent production. Unfortunately, publishing papers from a wide range of different types of scientists creates inconsistencies in reporting and style. The lack of consistency in the quality of figures, the presentation of tables and style of

references is obvious in the book. Both paper and electronic copies lack a glossary and an index, making searching difficult in a book with 659 pages. The volume may be a useful addition to institutional libraries but at \$200 I do not recommend it to individual purchasers. I suggest that future conference proceedings should publish fewer, more select papers, and reduce the

time between the conference and publication of the proceedings.

BALWANT SINGH

Faculty of Agriculture, Food and Natural Resources
The University of Sydney
Sydney, NSW 2006
Australia

FORTHCOMING PAPERS

The following are some papers that have been accepted for publication in future issues of *Clays and Clay Minerals*:

- Bella B. Zviagina, Douglas K. McCarty, Jan Środoń and Victor A. Drits. Interpretation of infrared spectra of dioctahedral smectites in the region of OH-stretching vibrations
- Sally D. Logsdon and David A. Laird. Electrical conductivity spectra of smectites as influenced by saturating cation and humidity
- Bart Baeyens and Michael H. Bradbury. Cation exchange capacity measurements on illite using the sodium and cesium isotope dilution technique: effects of the index cation, electrolyte concentration and competition: modeling
- Kirill Aldushin, Guntram Jordan, Michael Fechtelkord, Wolfgang W. Schmahl, Hans-Werner Becker and Werner Rammensee. On the mechanisms of apophyllite alteration in aqueous solutions. A combined AFM, XPS, and MAS NMR study
- Javier M. Gonzalez and David A. Laird. Role of smectites and Al-substituted goethites on the catalytic condensation of arginine and glucose
- Yauh-Yarng Fahn, Pouyan Shen and An-Chung Su. Biomimetic co-assembly of gibbsite and mesophases: a novel synthesis route by devitrification of gel derived from hydrothermal aluminosilicate/CTAB solution
- L. P. Vidhana Arachchi, Y. Tokashiki and S. Baba. Mineralogical characteristics and micromorphological observations of brittle/soft Fe/Mn concretions from Okinawan soils
- Simona Vingiani, Dominique Righi, Sabine Petit and Fabio Terribile. Mixed-layered kaolinite-smectite minerals in a red-black soil sequence from basalt in Sardinia (Italy)
- E. García-Romero, M. Suárez Barrios and M.A. Bustillo Revuelta. Characteristics of a Mg-palygorskite in Miocene rocks (Madrid Basin, Spain)
- N. Karakaya, M. Çelik Karakaya, A. Temel, Ş. Kūpeli and C. Tunoğlu. Mineralogical and chemical characterization of sepiolite occurrences at Karapınar (Konya Basin, Turkey)