

# CLAY MINERALS

JOURNAL OF THE  
EUROPEAN CLAY GROUPS

PRINCIPAL EDITORS: G. E. CHRISTIDIS, J. M. ADAMS

ASSOCIATE EDITORS:

D. L. BISH, C. BREEN, J. CORNEJO, E. FERRAGE,  
J. A. LABRINCHA, B. SINGH, H. STANJEK, L. N. WARR

Volume 48

2013

THE MINERALOGICAL SOCIETY

12 BAYLIS MEWS, 93–101 AMYAND PARK ROAD,  
TWICKENHAM TW1 3HQ, UK

# TABLE OF CONTENTS

(No. 1, March, 2013)

	<i>Page</i>
<i>Editorial Note</i>	i
A. A. Masoud, G. Christidis and K. Koike. Characterization of El-Tih kaolin quality using mineralogical, geochemical and geostatistical analyses	1
Ts. Stanimirova, S. Dencheva and G. Kirov. Structural interpretation of anion exchange in divalent copper hydroxysalt minerals	21
Battaglia, F. Gherardi, G. Gianelli, L. Leoni and M. Lezzerini. Alteration of clay minerals in a sedimentary caprock and its use in geothermal prospecting: an example from Mt. Amiata	37
M. J. Trindade, F. Rocha, M. I. Dias and M. I. Prudêncio. Mineralogy and grain-size distribution of clay-rich rock units of the Algarve Basin (South Portugal)	59
İ. Sargin and N. Ünlü. Insights into cationic methyl violet 6B dye–kaolinite interactions: kinetic, equilibrium and thermodynamic studies	85
M. Heuser, P. Andrieux, S. Petit and H. Stanjek. Iron-bearing smectites: a revised relationship between structural Fe, <i>b</i> cell edge lengths and refractive indices	97
S. Kaufhold, M. Klinkenberg and R. Dohrmann. Comparison of the dry densities of highly compacted bentonites	105
A. Steudel, D. Mehl and K. Emmerich. Simultaneous thermal analysis of different bentonite–sodium carbonate systems: an attempt to distinguish alkali-activated bentonites from raw materials	117
M. Cabuk, M. Yavuz, H. I. Unal and O. Erol. Synthesis, characterization and electrorheological properties of biodegradable chitosan/bentonite composites	129
<i>Review</i>	
F. L. Theiss, G. A. Ayoko and R. L. Frost. Stichtite: a review	143

(No. 2, May, 2013)

P. Landais, R. Dohrmann and S. Kaufhold. Overview of the clay mineralogy studies presented at the ‘Clays in natural and engineered barriers for radioactive waste confinement’ meeting, Montpellier, October 2012	149
<i>Alteration and migration studies in underground rock laboratories (URLs) and natural analogues</i>	
M. Aertsens, N. Maes, L. Van Ravestyn and S. Brassinnes. Overview of radionuclide migration experiments in the HADES Underground Research Facility at Mol (Belgium)	153
C. Watson, D. Savage, J. Wilson, S. Benbow, C. Walker and S. Norris. The Tournemire industrial analogue: reactive-transport modelling of a cement–clay interface	167
T. Yamaguchi, M. Kataoka, T. Sawaguchi, M. Mukai, S. Hoshino, T. Tanaka, F. Marsal and D. Pellegrini. Development of a reactive transport code MC-CEMENT ver. 2 and its verification using 15-year <i>in situ</i> concrete/clay interactions at the Tournemire URL	185
S. Kaufhold, R. Dohrmann, T. Sandén, P. Sellin and D. Svensson. Mineralogical investigations of the first package of the alternative buffer material test – I. Alteration of bentonites	199

- R. Dohrmann, S. Olsson, S. Kaufhold and P. Sellin. Mineralogical investigations of the first package of the alternative buffer material test – II. Exchangeable cation population rearrangement 215
- W. R. Alexander, A. E. Milodowski, A. F. Pitty, S. M. L. Hardie, S. J. Kemp, J. C. Rushton, A. Siathas, A. Siathas, A. B. MacKenzie, P. Korkeakoski, S. Norris, P. Sellin and M. Rigas. Bentonite reactivity in alkaline solutions: interim results of the Cyprus Natural Analogue Project (CNAP) 235

*Clay microstructure investigations*

- A. Muurinen, T. Carlsson and A. Root. Bentonite pore distribution based on SAXS, chloride exclusion and NMR studies 251
- M. Matuszewicz, K. Pirkkalainen, V. Liljeström, J.-P. Suuronen, A. Root, A. Muurinen, R. Serimaa and M. Olin. Microstructural investigation of calcium montmorillonite 267

*Alteration processes in bentonite buffer systems*

- A. Itälä, J. Järvinen and A. Muurinen. CO<sub>2</sub> effect on the pH of compacted bentonite buffer on the laboratory scale 277
- H. Satoh, T. Ishii and H. Owada. Dissolution of compacted montmorillonite at hyperalkaline pH and 70°C: *in situ* VSI and *ex situ* AFM measurements 285
- E. Myllykylä, M. Tanhua-Tyrkkö, A. Bouchet and M. Tiljander. Dissolution experiments of Na- and Ca-montmorillonite in groundwater simulants under anaerobic conditions 295
- T. Heikola, S. Kumpulainen, U. Vuorinen, L. Kiviranta and P. Korkeakoski. Influence of alkaline (pH 8.3–12.0) and saline solutions on chemical, mineralogical and physical properties of two different bentonites 309
- T. Ishii, R. Yahagi, H. Owada, I. Kobayashi, M. Takazawa, K. Yamaguchi, Y. Takayama, S. Tsurumi and A. Iizuka. Coupled chemical-hydraulic-mechanical modelling of long-term alteration of bentonite 331
- M. Valter and M. Plötze. Characteristics of variably saturated granular bentonite after long-term storage at near-field relevant temperatures 343

*Thermo-hydro-mechanical and chemical processes in the engineered barrier system*

- K. Suzuki, H. Asano, R. Yahagi, I. Kobayashi, P. Sellin, C. Svemar and M. Holmqvist. Experimental investigations of piping phenomena in bentonite-based buffer materials for an HLW repository 363
- J. Svoboda. The experimental study of bentonite swelling into fissures 383
- L. L. Wang, M. Bornert, S. Chanchole, D. S. Yang, E. Héripré, A. Tanguy and D. Caldemaison. Micro-scale experimental investigation of the swelling anisotropy of the Callovo-Oxfordian argillaceous rock 391
- T. Yamaguchi, T. Sawaguchi, M. Tsukada, M. Kadowaki and T. Tanaka. Changes in hydraulic conductivity of sand-bentonite mixtures accompanied by alkaline alteration 403
- T. Sawaguchi, T. Yamaguchi, Y. Iida, T. Tanaka and I. Kitagawa. Diffusion of Cs, Np, Am and Co in compacted sand-bentonite mixtures: evidence for surface diffusion of Cs cations 411

(No. 3, June, 2013)

- J. Cuadros, B. Afsin, P. Jadubansa, M. Ardakani, C. Ascaso and J. Wierzechos. Pathways of volcanic glass alteration in laboratory experiments through inorganic and microbially-mediated processes 423

- K. Khawmee, A. Suddhiprakarn, I. Kheoruenromne, I. Bibi and B. Singh. Dissolution behaviour of soil kaolinites in acidic solutions 447
- H. Stanjek, R. Glasmann and A. Hellmann. Smectite contents of road aggregates derived from crushed volcanic rocks and their impact on the durability of road pavements 463
- D. G. G. Delavi, A. De Noni jr and D. Hotza. Deflocculant consumption of clay suspensions as a function of specific surface area and cation exchange capacity 473
- A. Manceau and W. P. Gates. Incorporation of Al in iron oxyhydroxides: implications for the structure of ferrihydrite 481
- C. A. Piccinini, S. Bragança and C. P. Bergmann. Characterization method through the electrophoretic behaviour of clays in an aqueous medium 491
- J. R. Mache, P. Signing, A. Njoya, F. Kunyukubundo, J. A. Mbey, D. Njopwouo and N. Fagel. Smectite clay from the Sabga deposit (Cameroon): mineralogical and physicochemical properties 499
- M. Çiflikli, E. Çiftçi and H. Bayhan. Alteration of glassy volcanic rocks to Na- and Ca-smectites in the Neogene basin of Manisa, western Anatolia, Turkey 513
- J. C. Fernández-Caliani, V. Timón, M. B. Rivera, I. Giráldez and R. Pérez-López. Experimental and theoretical evidence of zinc structurally bound in vermiculite from naturally metal-enriched soils 529

#### 10th George Brown Lecture

- L. Pentráková, K. Su, M. Pentrák and J. W. Stucki. A review of microbial redox interactions with structural Fe in clay minerals 543

#### Erratum

561

(No. 4, September, 2013)

- S. Hillier, E. M. M. Marwa and C. M. Rice. On the mechanism of exfoliation of 'Vermiculite' 563
- S. Gamoudi, N. Frini-Srasra and E. Srasra. Solid-state intercalation of cationic surfactants into Tunisian smectites 583
- L. A. Shah, N. S. Khattak, M. G. S. Valenzuela, A. Manan and F. R. Valenzuela Díaz. Preparation and characterization of purified Na-activated bentonite from Karak (Pakistan) for pharmaceutical use 595
- X. Y. Zhou, H. F. Liu, X. Z. Lu, J. C. Hao, L. L. Shi and Q. Hu. Effect of Zn on the adsorption and desorption of Cry1Ab toxin from *Bacillus thuringiensis* on clay minerals 605
- V. Önen and E. Yel. Adsorption of ferrocyanide onto raw and acid-activated clinoptilolite and sepiolite: equilibrium modelling by error minimization 613
- J. X. Zhang, Q. X. Zhou and W. Li. Adsorption of enrofloxacin from aqueous solution by bentonite 627
- S. K. Chaerun, K. Tazaki and M. Okuno. Montmorillonite mitigates the toxic effect of heavy oil on hydrocarbon-degrading bacterial growth: implications for marine oil spill bioremediation 639

#### Technical note

- A. Nzeukou Nzeugang, R. Medjo Eko, N. Fagel, V. Kamgang Kabeyene, A. Njoya, A. Balo Madi, J. R. Mache and U. Melo Chinje. Characterization of clay deposits of Nanga-Eboko (central Cameroon): suitability for the production of building materials 655

(No. 4, December, 2013)

L. J. Michot, E. Paineau, I. Bihannic, S. Maddi, J. F. L. Duval, C. Baravian, P. Davidson and P. Levitz. Isotropic/nematic and sol/gel transitions in aqueous suspensions of size selected nontronite NAu1	663
G. E. Christidis and E. Koutsopoulou. A simple approach to the identification of trioctahedral smectites by X-ray diffraction	687
F. S. Oliveira, A. F. D. C. Varajão, C. A. C. Varajão and B. Boulangé: A comparison of properties of clay minerals in isalteritic and in degraded facies	697
A. C. Silva, F. H. A. Bispo, S. de Souza, J. D. Ardisson, A. J. S. Viana, M. C. Pereira, F. R. Costa, E. Murad and J. D. Fabris. Iron mineralogy of a grey Oxisol from the Jequitinhonha River Basin, Minas Gerais, Brazil	713
G. Durn, J. Hrenovic and L. Sekovanic. Terra rossa as the substrate for biological phosphate removal from wastewater	725
Yufeng Chen and Gensheng Yu. Synthesis and optical properties of composites based on ZnS nanoparticles embedded in layered magadiite	739
C. S. Costa, F. Rocha, H. Varum and A. Velosa. Influence of the mineralogical composition on the properties of adobe blocks from Aveiro, Portugal	749
B. Kar, H. Sahoo, S. S. Rath, D. S. Rao and B. Das. Characterization and beneficiation studies for the removal of iron from a china clay from India	759
A. Bourliva, K. Michailidis, C. Sikalidis, A. Filippidis and M. Betsiou. Lead removal from aqueous solutions by natural Greek bentonites	771
<i>Obituary</i>	789
<i>Errata</i>	791
<i>Referees for Volume 48</i>	792