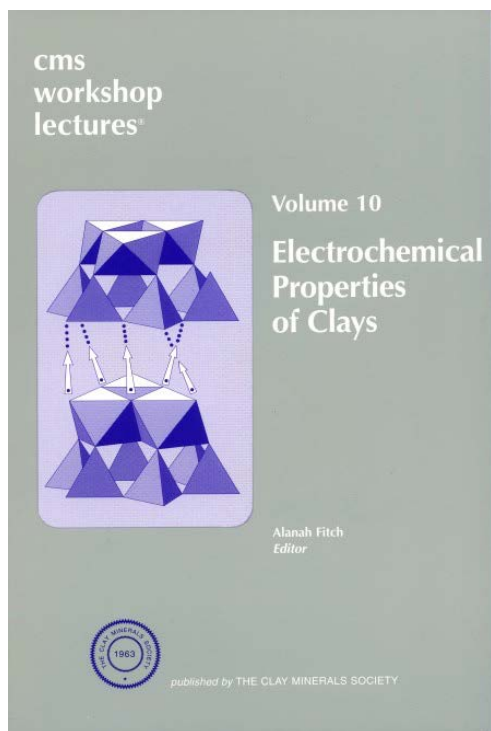


**Workshop Lectures
The Clay Minerals Society
Volume 10
Table of Contents**



Volume 10, 2002, Electrochemical Properties of Clays

Alanah Fitch, Editor

Introduction to Electrochemical Techniques for Clay
Chemists.....Susan Macha, Scott Baker, and Alanah Fitch

INTRODUCTION

NON-FARADAIC PROCESSES

The Passive Electrified Interface

Transport Mechanisms in Charged Matrices

Electroosmosis

Electromigration and Conductivities

Electrochemical Remediation of Metal Contaminated Soils

FARADAIC PROCESSES

Electron Transfer Reactions

Gradients Set Up by Electron Transfer Reactions

The Cyclic Voltammogram (CV)

Electrochemistry in Colloidal Suspensions

CV Experiments at a Clay-Modified Electrode (CME)

CME CV as a Miniature Chromatographic Column
Direct Determination of D by Varying the Scan Rate
Ratio Currents

CME CV Examples

Pore Volume Samplers: Anionic Probes
CME CV of DDL Cations
Complex Kinetic Applications
Future Applications to Halogenated Organics
in Soil Matrices
Non-Diffuse Double Layer Compounds

DIRECT ELECTROCHEMISTRY OF CLAY TRANSITION METAL
SITES

LABORATORY PRACTICES

SUMMARY

REFERENCES

Application of Langmuir-Blodgett Method for Preparing a
Clay-Modified Electrode.....Aki Yamagishi

INTRODUCTION

A MONOLAYER OF A HYDROPHOBIC CLAY

Preparation of a LB film of a clay ion-exchanged
with alkyl ammonium
AFM observation of a deposited LB film
X-ray diffraction of a clay film prepared by the
Langmuir-Blodgett method
Electrochemical measurements on an electrode modified with a LB
film of a clay
A proposed structure of a LB film of a clay

A HYBRID MONOLAYER OF A CLAY AND A METAL COMPLEX

Preparation of a clay LB film using a cationic monolayer as a
template
Observation with a Brewster angle microscope
Multilayer properties as studied with various spectroscopic
methods
Surface structures of a clay film as observed with AFM

CONCLUSIONS

ACKNOWLEDGEMENTS

REFERENCES

Iron Redox Chemistry of Clays and Oxides:
Environmental Applications.....James E. Amonette

INTRODUCTION

- Iron associated with minerals
- Iron as a reductant

REDOX CHEMISTRY OF IRON

- Electronic structure
- Thermodynamics
 - Reduction potentials from free-energy data
 - Reduction potentials from electronic structures
 - Solid-phase reduction potentials

ENVIRONMENTAL APPLICATIONS

- Kinetics
- Environmental contaminants
 - Chlorinated hydrocarbons
 - Nitroaromatics
 - Inorganic species
 - Redox mediators and buffers
- Natural attenuation processes
- In-situ redox manipulation
 - Dithionite barrier concept and chemistry
 - Reduction of Cr(VI)
 - Reduction of chlorinated compounds
 - Reduction of nitroaromatic compounds
- Iron as an oxidant
 - Oxidative polymerization of aminoaromatic compounds
 - Humic substance formation
 - As(III) oxidation and sorption

ACKNOWLEDGMENTS

REFERENCES

Electron Transport in Electrodes Modified with Synthetic Clays Containing Electrochemically Active Transition Metal Sites.....Gilles Villemure

INTRODUCTION

- Electrode modifications with natural clays
- Electron transfer between iron sites in the clay lattices and species adsorbed in CMEs

ELECTRODE MODIFICATION WITH SYNTHETIC CLAYS.

- Introduction
- Preparation of synthetic transition metal smectites
- Electrochemistry of the synthetic Fe-smectites

Electrochemistry of the synthetic Co-smectites
Electrochemistry of the synthetic copper clays

ELECTRODE MODIFICATION WITH LAYERED
DOUBLE HYDROXIDES

Preparation of layered double hydroxides
Electrochemistry of LDH films in blank electrolyte solutions
LDH-modified electrodes containing electroactive ions

CONCLUSIONS
ACKNOWLEDGMENTS
REFERENCES

Structure and Dynamics of Nanocomposite Polymer
Electrolytes.....Evangelos Manias, Athanassios Z. Panagiotopoulos, David
B. Zax, and Emmanuel P. Giannelis

INTRODUCTION
EXPERIMENTAL

Materials
Methods

IONIC CONDUCTIVITY OF PEO NANOCOMPOSITES
COOPERATIVE MOTION: TSC AND DSC
LOCAL CHAIN DYNAMICS: NMR
COMPUTER SIMULATIONS OF NANOCOMPOSITES
CONCLUSIONS
ACKNOWLEDGEMENT
REFERENCES