ISBN(softcover): 978-0-87849-158-2 ISBN(eBook): 978-3-03813-447-3

Table of Contents

Preface
Table of Contents
Summary

1. Periodical Pulsation Ionic Flow Properties of Oxo-Olic Complexes of Zirconium and Silicium

1.1 Polymerization of the Hydrated Particles of Zirconium Oxyhydrate 1
1.2 Emission-Wave Duality of Behavior of the Periodical Processes in the D- and F-Elements' Oxyhydrates. 1.3 Periodicity of the Efficient Diffusion Coefficients 6
1.4 Quantization of the Pacemakers' Radiuses in Oxyhydrate Gels 7
1.5 Bifurcation of the Pacemakers' Radius Doubling in Gel Oxyhydrate Systems 8
1.6 Extensional Dilatancy and Dimensions of the Pacemakers 10
1.7 The Periodical State Isotherm 11
Abstract 1.1 13
1.8 other Forms and Types of Oscillatory Motions in Oxyhydrate Systems 14
Abstract 1.2. Instrumental Support 16

2. Behavior of Zirconium Oxyhydrate Gels Affected by the Spontaneous Pulsating Electrical Currents

2.1 Theory 21
2.2 Synchronization of the Periodical Oxyhydrate Systems 24
2.3 Mathematical Modeling Problem 25
2.4 Connections between Certain Self-Organization Parameters 32
2.5 Conclusions 38

3. Zirconium Oxyhydrate Gels with Specifically Repeated Pulsation Macromolecules' Organizations: the Experimental Aspect

3.1 Some of the TGM's Experimental Results 40
3.2 Oxyhydrate Clusters Structuring in Non-Equilibrium Conditions 45
3.3 the Way the Ageing Time Affects the Sorption Properties of the Zirconium Oxyhydrate 53
3.4 Conclusions 54

4. Modeling of the Oxyhydrate Gels' Shaping in an Active Excitable Medium. the Phase Transition Operator in Gels' Oxyhydrates (the Liesegang Operator)

4.1 Modeling of Autowave Shaping Processes in D- and F- Elements' Oxyhydrate Gels. the Simplest Mathematical Model of the Reaction-Diffusion Type 56
4.2 Studies of a Modeled Oxyhydrate System 62
4.3 Modeling of the Gel Shaping in an Active Excitable Medium by Means of the Molecular Dynamics Methods and the Monte Carlo Method 73
4.4 Coulomb Diffusion Model 77

5. Liesegang Operator

4.5 Conclusions 87

5.1 Liesegang Operator as a Reflection of the Gel Polymer Systems' Oscillatory Properties. Introduction of the Liesegang Operator 89
5.2 Studying a Highly Nonlinear Diffusion Equation 92
Abstract 5.1 Theorems 94
Abstract 5.2 Gel's Formation Stationary Problem 101
5.3 Simplified Notation for the Liesegang Operator 105
5.4 Hydrodynamic Approach 113
5.5 Liesegang Operator and some Experimental Data 114
5.6 Conclusions 121

6. Liesegang Operator as a Consequence of the Ionic Molecular Motion inside the Lenard-Jones Potential

6.1 Single-Particle Problem. Cluster's Motion in the Field of the Lenard-Jones Potential 123
6.2 Cluster Motion in the Lenard-Jones Potential 131
6.3 Experimental Detection of the Current Surges' Periodical Toroid Conformations in the Gel Oxyhydrate Systems, the Structural Self-Organization Stages 151
Abstract 6.1 Formative Characteristics of Zirconium Oxyhydrate Conformers 156
6.4 Colloid Chemical Version of the Arnold Diffusion in Oxyhydrate Systems 161
6.5 Conclusions 167

7. Organizational Mechanism in Colloid Chemical Stochastic Systems

7.1 Compiled Theoretical Consideration of the Synchronization Mechanism in Stochastic Systems as such 171
7.2 Calculation and Recovery of the Self-Organization Current Surges' Attractors in the Zirconium Oxyhydrate's Macromolecules with an Optimal Delay 184
7.3 Role of the Noise in Excitable Oxyhydrate Systems 185
7.4 Analysis of Experimental Poincaré Cross-Sections in Zirconium, Oxyhydrate Colloid Gels 191
7.5 Conclusions 215
Abstract 7.1 Album 219
Abstract 7.2 Table 1. Dimensions and Frequencies of the Clusters Formed in the Zirconium Gel Oxyhydrate Systems 395
Abstract 7.3 Table 2. some Data on Ageing of the Zirconium Oxyhydrate Gel 401

8. Phase Flow of Oxyhydrate Gels and their Place among the Concepts of Colloid Chemistry

8.1 Attractors in Colloid Chemical Flow Systems 405
8.2 Experimental Manifestation of Alterations in Noise Viscous Parameters of Gel Oxyhydrate Systems when they Flow 418
8.3 Formation of Nonequilibrium Oxyhydrate Structures 425
8.4 Conclusions 428
Abstract 8.1 430

9. Optical and other Properties, and Gel Oxyhydrate "noise"

9.1 Light Absorption Equation on Conformer "Noise" Clusters 457
9.2 The Way the Pulsation Noise or Self-Organizational Current in a Magnetic Field Affects Optical Parameters of Zirconium Oxyhydrate 465
9.3 Optical Density Kinetic Curves for Yttrium Oxyhydrate Gels 469
9.4 Conclusions 476

10. “Lag Effect.” The Way an External Magnetic Activation Affects Oxyhydrate Gels

10.1 The Way an External Magnetic Field Affects Toroid Stochastic Noise in a Gel Oxyhydrate System 479

10.2 Stable Magnetic Field and Oxyhydrate Gels’ Freshly Deposed Residues 485

10.3 Conclusions 488

References