771.53 ZEL

CONTENTS

Preface	7
Biographical notes	9
Introduction	11
1. General Information on the Structure and Properties of Silver-Halide Photographic layers	11
2. Technological Production of Photographic Emulsions	17
3. Emulsion coating	22
4. Drying and Finishing	30
I. PHOTOGRAPHIC GELATIN AND SUBSTITUTES	35
5. Structure of Collagen and Gelatin	35
6. Chemical and Physico-chemical properties of Gelatin	43
7. Colloid-Chemical Functions of Gelatin in Emulsion Making	46
8. Protective Functions of Gelatin in Emulsion Making	48
9. Physico-mechanical Properties of Gelatin Solutions, Gels, and Xerogels	52
10. Polymers used as Gelatin Substitutes	61
II. EMULSIFICATION	69
11. Physical Nature of Emulsification	69
12. Emulsification Equations	70
13. Effects of Various Factors in Emulsification on the Grain Size and Photographic Propert	ies 74
14. New Data on the Mechanism of Emulification	87
III. PHYSICAL RIPENING AND METHODS OF WASHING	93
15. Principal functions of the Physical Ripening Stage and Grain-size Characteristics	93
16. Kinetics of Silver-Halide Crystallization	99
17. Relationship between the photographic and Grain-Size Characteristics of Emulsions	106
18. Effect of Excess Soluble Bromide on first Ripening	109
19. Effect of Ammonia on the crystallization of Silver Halide	116
20. Effect of the Silver-Halide composition on the Properties of the Crystals formed	119
21. Effect of the Concentrations of the Components, Temperature, and time of first	
Ripening on Emulsion Properties	125
22. The Principle of Minimal surface Energy. Formation of different Crystalline.	
Forms of Silver Halide	128
23. Effect of the sign of the Charge of the Excess Ions on Crystallization of silver Halide	131
24. New Data on Physical Ripening of Potographic Emulsions	138
25. Effect of ultrasonics in Emulsion Making	141
26. The "Red Shift Rule" for Photographic Emulsions	142
27. Transition from First to Second (Chemical) Ripening	144
28. Methods of Washing the Emulsion With Separation of the Solid Phase by Coagulation	146

29.	Methods of Washing with Direct separation of the Solid Phase	149
IV.	CHEMICAL RIPENING	161
30.	Functions of Chemical Ripening	161
31.	Influence of Impurities in gelatin on Chemical ripening	165
32.	Classification of Gelatin by Photographic Properties	175
33.	Nature and Physical State of the sensitivity centers	179
34.	Dependence of chemical ripening on Temperature	190
35.	Effect of Electrolyte Concentration on Chemical Sensitization	196
36.	Special Types of Chemical Sensitization	203
37.	Keeping Qualities of Photographic Layers	207
V.	PRINCIPAL CONDITIONS FOR EMULSION MANUFACTURE	219
38.	Comparison of Methods of Emulsion Manufacture	219
39.	General Principles and Conditions of Emulsion Preparation	225
40.	Continuous Processes of emulsion Making	228
41.	Production of Contrast in photographic Emulsions	234
VI.	PHYSICAL CHEMISTRY OF PROCESSES PREPARING THE EMULSION	
	FOR COATING	243
42.	Technological Significance of the Pre-coating Stage	243
43.	Effects of Temperature, concentration and Time on the Physical and mechanical	
	Properties of Gelatin and Emulsions	244
44.	Effects of Surface-active Agents on the physical and Mechanical Properties of	
	Gelatin Solutions	250
45.	Influence of the Gelatin-silver Ration in the Emulsion on Its Physical and	
	Mechanical Properties	254
46.	Physico-chemical Properties and Structure of Wetting Agents	257
47.	Wetting Agents Used in Emulsion Coating	262
48.	Hardening and Plasticization of Emulsion Layers	266
VII	. COATING THE EMULSION ONTO THE SUPPORT	277
49.	Technological Aspects of the Coating Process	277
50.	Theory of Emulsion coating on Flexible Supports	279
51.	Technological Application of the Coating theory	297
52.	Calculation Nomograms	303
AB	BREVIATIONS	307