

# CONTENTS

## INTRODUCTION

|  |     |
|--|-----|
| <b>TABLE 1: ORGANIC FLOCCULANTS CLASSIFIED BY CHEMICAL COMPOSITION</b> . . . . .                         | 5   |
| Flocculants from Natural Sources (Natural and Chemically Modified) . . . . .                             | 6   |
| Starch, Modified Starch, and Starch Derivatives. . . . .   | 6   |
| Cellulose Derivatives . . . . .  | 11  |
| Other Polysaccharides . . . . .  | 11  |
| Vegetable Gums and Other Vegetable Substances, Chemically Modified. . . . .                              | 13  |
| Proteins and Proteinaceous Products . . . . .  | 16  |
| Flocculants Based on Acrylic Acid and Methacrylic Acid Polymers . . . . .                                | 17  |
| Acrylic Acid, Its Salts and Copolymers . . . . .   | 17  |
| Methacrylic Acid and Its Derivatives . . . . .   | 21  |
| Polyacrylamides, Polymethacrylamides, Their Copolymers, Derivatives and Mixtures . . . . .               | 23  |
| Polyacrylonitrile, Its Hydrolysis Products, Copolymers, etc. . . . .                                     | 44  |
| Flocculants Based on Polyvinyl Alcohol and Its Derivatives . . . . .                                     | 45  |
| Polyvinyl Alcohol, Its Derivatives and Copolymers . . . . .  | 45  |
| Polyvinyl Acetate and Its Derivatives . . . . .  | 46  |
| Flocculants Based on Polyvinylamine, Polyvinylsulfonic Acid, Polyacrolein . . . . .                      | 47  |
| Flocculants Based on Maleic Acid and Its Anhydride . . . . .   | 48  |
| Flocculants Based on Polyamines and Related Substances . . . . .   | 49  |
| Polyamines. . . . .  | 49  |
| Condensation Products of Polyamines (and Amines) and Halogen Hydrocarbons . . . . .                      | 51  |
| Various Modified Polymers—Polyamino . . . . .  | 53  |
| Polyamines and Halohydrins . . . . .   | 54  |
| Reaction Products of Amines (Poly) and Aldehydes. . . . .  | 56  |
| Flocculants Based on Alkylenimines (Aziridines), Ethylene (Alkylene) Oxides . . . . .                    | 57  |
| Flocculants Based on Polyamides . . . . .  | 61  |
| Flocculants Based on Polystyrene . . . . .   | 62  |
| Flocculants Based on Heterocyclic Polymers. . . . .  | 64  |
| Flocculants Based on Polymers of Diallylammmonium (and Diallyldialkylammmonium) Salts. . . . .           | 67  |
| Flocculants Based on Polysulfones and Polysulfines . . . . .   | 68  |
| Mixture of Flocculants (Synergistic Combination) . . . . .   | 69  |
| Key to Abbreviations of Journals . . . . .   | 72  |
| <b>TABLE 2: COMMERCIAL FLOCCULANTS AND THEIR CHARACTERISTICS (COMMERCIAL POLYELECTROLYTES) . . . . .</b> | 77  |
| Explanatory Notes. . . . .   | 116 |
| <b>TABLE 3: USE OF ORGANIC FLOCCULANTS IN WATER TREATMENT . . . . .</b>                                  | 119 |
| <b>TABLE 4: MANUFACTURERS AND DISTRIBUTORS OF ORGANIC FLOCCULANTS . . . . .</b>                          | 161 |