

Table of Contents

Preface

Non Linear Differential Equations: Singularities, Bifurcations,... F. Ducastelle	1
Some General Aspects of Non Linear Phenomena M. Grosbras	17
Dynamics of Nonequilibrium Systems in the Weakly Nonlinear Regime C. Misbah	29
Normal Form Description of Broken Symmetries P. Coullet and L. Gil	57
Instabilities and Patterns in Reaction-Diffusion Dynamics D. Walgraef	77
Deterministic and Stochastic Models J.P. Gaspard	97
Fluctuations around Equilibrium and Steady-States in Solids under Dynamical Solicitations P. Bellon and G. Martin	109
Structure Formation by Dissipative Processes in Crystals with High Defect Densities A. Seeger and W. Frank	125
Dendritic Pattern Formation Y. Saito, G. Goldbeck-Wood and H. Müller-Krumbhaar	139
Thermodynamics of Solidification and Kinetic Effects B. Caroli, C. Caroli and B. Roulet	143
Spongy Behaviour of Alloys during Solidification: Flow of Liquid Metal and Segregation in the Mushy Zone G. Lesoult and S. Sella	167
Solid Solution Unmixing J.P. Simon, P. Guyot and O. Lyon	179
Phase Separation and Percolation D.W. Heermann	193
Decomposition of Binary Alloys with Long Range Interactions F. Haider	203
Thermodynamics of Stressed Solids F.C. Larche	205
Amorphization by Solid-State Reaction M. Gerl and P. Guilmin	215
Non Linear Mass Transport in an Amorphous Model System Subjected to an External Perturbation: A Non-Equilibrium Molecular Dynamics Study C. Massobrio, V. Pontikis and G. Ciccotti	225
Shape Bifurcations in the Coarsening of Precipitates in Elastically Constrained Systems T. Miyazaki, M. Doi and T. Kozakai	227
Nonequilibrium Formation of Compounds in Thin Films F.M. d'Heurle	237
Coherency Stress Effects on the Growth Kinetics of Thin Films W.C. Johnson and G. Martin	247
Non Linear Phenomena in Oxidation of Metals and Alloys G. Bertrand	257
Self Organization and Stability of Rate Processes during Irradiation K. Krishan	267
Dislocation Patterning under Irradiation W. Jäger, P. Ehrhart and W. Schilling	279
Formation of Heterogeneous Dislocation Structures during Irradiation S.M. Murphy	295

Cavity Lattice Formation in Metals: An Experimental Survey and a Possible Explanations Based on Planar Diffusion of Self-Interstitials J.H. Evans	303
The Role of Anisotropic Interstitial Diffusion in the Self-Organization of Void Lattices W. Frank	315
Adiabatic Approximation for Irradiation-Induced Instabilities in Concentrated Alloys C. Abromeit and G. Martin	321
Dislocation Patterning in Uniaxial Deformation F. Louchet and Y. Bréchet	335
Localization of Plastic Deformation Y. Bréchet and F. Louchet	347
Dislocation Dynamics and Cooperative Behaviour of Dislocations G. Ananthakrishna	357
The Dynamic Stability of High Temperature Plastic Flow M. Boček	369
Computer Simulation of Dislocation Pattern Formation N.M. Ghoniem and R. Amodeo	377
Simulation of the Dynamic Organization of Dislocation Structures J. Lépinoux	389
On the Problem of Dislocation Patterning and Persistent Slip Bands E.C. Aifantis	397
Slip Propagation and Fine Structure H. Neuhäuser	407
Classification of Plastic Instabilities by Linear Stability Analysis Y. Estrin	417
Instabilities Related to Mechanical Twinning in Cu-Al Alpha Solid Solutions F. Tranchant, J. Vergnol, A. Coujou and J. Grilhé	429
Bifurcation Analysis of Shear Banding in Metals A. Zaoui, A. Korbé, P. Dubois and C. Rey	433
Shear Band Analysis A. Molinari	447
Planar Simple Shear Test Applied to Predeformed Mild Steel E.F. Rauch	469
Irreversible Thermodynamics of Metals under Stress M.G. Beghi, C.E. Bottani and G. Caglioti	471
Relaxation Oscillations and Stick-Slip of Materials L.P. Kubin and J. Poirier	473
Electrical Instabilities in Inorganic Chain Compounds D. Feinberg and J. Friedel	483
Solitons, Defects and Chaos in a Dissipative System R. Ribotta	489
Pitchfork Bifurcation of Dislocation Locks J. Thibault-Desseaux and H.O.K. Kirchner	497