



Chemical Instabilities

edited by G. Nicolis and F. Baras

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Chemical Instabilities

Applications in Chemistry, Engineering,
Geology, and Materials Science

edited by

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FOREWORD

On March 14-18, 1983 a workshop on "Chemical Instabilities : Applications in Chemistry, Engineering, Geology, and Materials Science" was held in Austin, Texas, U.S.A. It was organized jointly by the University of Texas at Austin and the Université Libre de Bruxelles and sponsored by NATO, NSF, the University of Texas at Austin, the International Solvay Institutes and the Exxon Corporation.

The present Volume includes most of the material of the invited lectures delivered in the workshop as well as material from some posters, whose content was directly related to the themes of the invited lectures.

In recent years, problems related to the stability and the nonlinear dynamics of nonequilibrium systems invaded a great number of fields ranging from abstract mathematics to biology. One of the most striking aspects of this development is that subjects reputed to be "classical" and "well-established" like chemistry, turned out to give rise to a rich variety of phenomena leading to multiple steady states and hysteresis, oscillatory behavior in time, spatial patterns, or propagating wave fronts.

The primary objective of the workshop was to bring together researchers actively engaged in fields in which instabilities and nonlinear phenomena similar to those observed in chemistry are of current and primary concern : chemical engineering (especially surface catalysis), combustion (dynamics of ignition, flame stability), interfaces (emulsification, dendritic growth), geology (regularly repeated patterns of mineralization in a variety of space scales), and materials science (dynamical solidification, behavior of matter under irradiation).

We expect that the present Volume will acquaint researchers and advanced students with this important class of phenomena and with the mathematical, physical, and numerical techniques used to study them. Most of the basic problems in the area of nonequilibrium phenomena in nonlinear systems have not yet received extensive treatment. Cross-fertilization between different subjects is certainly one of the most promising avenues along which progress is likely to occur. We therefore hope that this Volume will serve as a jumping off point for new directions and new points of view.

Brussels, September 1983.

G. Nicolis and F. Baras

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