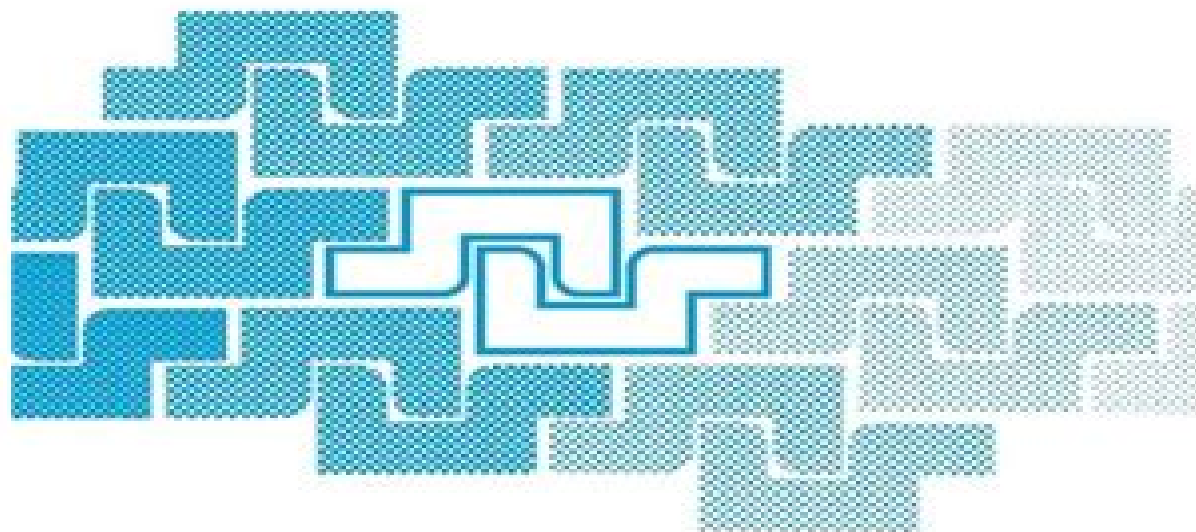




Solid State Astrochemistry

Edited by

Valerio Pirronello, Jacek Krelowski
and Giulio Manicò

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Solid State Astrochemistry

**Valerio Pirronello, Jacek
Krelowski, Giulio Manicò**



Solid State Astrochemistry:

Solid State Astrochemistry Valerio Pirronello, Jacek Krelowski, Giulio Manicò, 2003-11-30 The fundamentals of astrochemistry in the gas phase are relatively well established in contrast to the special relevance attributed to processes involving interstellar dust grains the solid component of matter diffused among the stars This book presents the state of the art in relation to the ways grains interact with gases the catalytic role played by dust that allows key molecular species H₂ as well as many complex possibly prebiotic species to be formed on its surface which cannot be obtained efficiently by any other mechanisms and the interaction between solids dust grains icy mantles cometary nuclei satellites of the giant planets and minor bodies in the Solar system in space and energetic agents such as UV photons and fast particles The presence and importance of PAH which may represent the smallest component of the grains is considered in relation to possible astrobiological pathways and the ever present mystery of the ubiquitous presence of Diffuse Interstellar Bands and their carriers

Solid State Astrochemistry Valerio Pirronello, Jacek Krelowski, Giulio Manicò, 2012-12-06 The fundamental role that Astrochemistry plays into regulating the processes that in interstellar clouds lead to the formation of stars and how these processes concur into affecting the shape and the dynamics of galaxies and hence into showing the Universe in the way it appears to us is well established Together with those occurring in the gas phase a special relevance is recognized to processes that involve interstellar dust grains the solid component of matter diffused among stars The school on Solid State Astrochemistry held at the Ettore Majorana Centre for Scientific Culture in Erice Sicily from the 5th to the 15th of June 2000 was the fifth course of the International School of Space Chemistry In spite of its very focused aim it was attended by 66 participants from 17 different countries that in the very special environment provided by the Majorana Centre discussed in great details the various aspects of the subject

The Chemistry of Cosmic Dust David A Williams, Cesare Cecchi-Pestellini, 2015-11-18 It has been firmly established over the last quarter century that cosmic dust plays important roles in astrochemistry The consequences of these roles affect the formation of planets stars and even galaxies Cosmic dust has been a controversial topic but there is now a considerable measure of agreement as to its nature and roles in astronomy and its initiation of astrobiology The subject has stimulated an enormous research effort with researchers in many countries now involved in laboratory research and in ab initio computations This is the first book devoted to a study of the chemistry of cosmic dust presenting current thinking on the subject distilled from many publications in surface and solid state science and in astronomy The authors discuss the nature of dust its formation and evolution the chemistry it can promote on its surfaces and the consequences of these functions The purpose of this book is to review current understanding and to indicate where future work is required Mainly intended for researchers in the field of astrochemistry the book could also be used as the basis of a course for postgraduate students who have an interest in astrochemistry

Dynamical Astrochemistry David A Williams, Thomas W Hartquist, Jonathan M C Rawlings, Cesare Cecchi-Pestellini, Serena Viti, 2017-12-14 Written by leading

experts in this area this is the first book specifically devoted to the astrochemistry of dynamically evolving astronomical regions *Proceedings of the Dalgarno Celebratory Symposium* A. Dalgarno, Kata Kirby, 2010 On September 10 2008 more than 125 friends colleagues to join Professor Alex Dalgarno in celebrating his 80th birthday A symposium highlighting Dalgarno's many scientific contributions Preface Laboratory Surface and Solid State Astrochemistry of Biomolecular Precursors on Grain Mimics Ali Ghith Moussa Abdulgalil, 2013 **Advances in Astronomy** J. M. T. Thompson, 2005 In this highly accessible book leading scientists from around the world give a general overview of research advances in their subject areas within the field of Astronomy They describe some of their own cutting edge research and give their visions of the future Re-written in a popular and well illustrated style the articles are mainly derived from scholarly and authoritative papers published in special issues of the Royal Society OCOs Philosophical Transactions the world OCOs longest running scientific journal Carefully selected by the journal OCOs editor topics include the Big Bang creation of the universe the formation and evolution of the stars and galaxies cold dark matter explosive sun spot events and humankind OCOs exploration of the solar system The book conveys the excitement and enthusiasm of the authors for their work at the frontiers of astronomy All are definitive reviews for people with a general interest in the future directions of science **Biochirality** Pedro Cintas, 2014-07-08 Early History of the Recognition of Molecular Biochirality by Joseph Gal Pedro Cintas Synthesis and Chirality of Amino Acids Under Interstellar Conditions by Chaitanya Giri Fred Goesmann Cornelia Meinert Amanda C Evans Uwe J Meierhenrich Chemical and Physical Models for the Emergence of Biological Homochirality by son E Hein Dragos Gherase Donna G Blackmond Biomolecules at Interfaces Chiral Naturally by Ar ntzazu Gonz lez Campo and David B Amabilino Stochastic Mirror Symmetry Breaking Theoretical Models and Simulation of Experiments by Celia Blanco David Hochberg Self Assembly of Dendritic Dipeptides as a Model of Chiral Selection in Primitive Biological Systems by Brad M Rosen C cile Roche Virgil Percec Chirality and Protein Biosynthesis by Sindrila Dutta Banik Nilashis Nandi Astrochemical Modeling Stefano Bovino, Tommaso Grassi, 2023-11-23 Astrochemical Modelling Practical Aspects of Microphysics in Numerical Simulations is a comprehensive and detailed guide to dealing with the standard problems that students and researchers face when they need to take into account astrochemistry in their models including building chemical networks determining the relevant processes and understanding the theoretical challenges and the numerical limitations The book provides chapters covering the theoretical background on the predominant areas of astrochemistry with each chapter following theoretical background with information on existing databases step by step computational examples with solutions to recurrent problems and an overview of the different processes and their numerical implementation Furthermore a section on case studies provides concrete examples of computational modelling usage for real world applications and cases where the techniques can be applied is also included Provides theoretical background on topics that is followed by computational examples and tailored tutorials to allow for full understanding and replication of techniques Written by theoreticians and

authors with direct experience on the computational implementation to provide a realistic and pragmatic approach to common problems Details up to date information on available databases tools and benchmarks for practical usage forming a good starting point for introductory readers and a reference for actual implementation for more advanced researchers

The Science of Solar System Ices Murthy S. Gudipati,Julie Castillo-Rogez,2012-07-28 The role of laboratory research and simulations in advancing our understanding of solar system ices including satellites KBOs comets and giant planets is becoming increasingly important Understanding ice surface radiation processing particle and radiation penetration depths surface and subsurface chemistry morphology phases density conductivity etc are only a few examples of the inventory of issues that are being addressed by Earth based laboratory research As a response to the growing need for cross disciplinary dialog and communication in the Planetary Ices science community this book aims to achieve direct dialog and foster focused collaborations among the observational modeling and laboratory research communities

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