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3.2 Artificial Comets: Organic Molecules Identified in Simulated Interstellar Ices; 3.3 Amino Acids in Simulated Interstellar Ices; 3.4 The Intended Detection of Organic Molecules in a Cometary Nucleus; 3.5 The Behavior of Organic Molecules During Cometary Impact; 3.6 The Origin of Life on Earth; References; Chapter 4: The Asymmetry of Life; 4.1 Introduction; 4.2 The Photochemical Formation of Chiral Organic Molecules; 4.3 Enantiomeric Excesses in Meteoritic Molecules; 4.4 Symmetry Breaking by the Weak Nuclear Interaction; 4.5 Enantioselective Instruments on the Mars Science Laboratory and ExoMars; References; Part II: The Rosetta Mission-Rendezvous with a Comet; Chapter 5: The Rosetta Cometary Mission: Launch and Target Comet; 5.1 Introduction; 5.2 Launch Countdown in 2002 and the Targeting of Comet 46P/Wirtanen; 5.3 The Successful Rosetta Launch with an Ariane 5G+ Rocket in 2004; 5.4 Characterization of Target Comet 67P/Churyumov-Gerasimenko; References; Chapter 6: On the Way to Comet 67P/Churyumov-Gerasimenko; 6.1 Accelerating the Rosetta Probe Using Swing-by Maneuvers Around Mars and Earth; 6.2 Rosetta's Observation of Comet 9P/Tempel during the Deep Impact Event in 2005; 6.3 Rosetta Spacecraft Mistaken as a Near-Earth Asteroid; 6.4 Rosetta's Asteroid Flybys: Steins in 2008 and Lutetia in 2010; 6.5 Rosetta Operations Prior to the Cometary Rendezvous; References; Chapter 7: Rosetta's Rendezvous with the Comet; 7.1 Introduction; 7.2 Rosetta in an Artificial Orbit Around the Comet; 7.3 Soft-landing on the Nucleus of Comet 67P/Churyumov-Gerasimenko: Rosetta's Landing Unit Philae; 7.4 First Photos to be Taken on a Cometary Nucleus; 7.5 The First Science Sequence on a Cometary Nucleus; 7.6 The Long-Term Science Sequence Approaching the Sun Piggyback on a Comet

Sommario/riassunto

Divided into two parts, the first four chapters of Comets and their Origin refer to comets and their formation in general, describing cometary missions, comet remote observations, astrochemistry, artificial comets, and the chirality phenomenon. The second part covers the cometary Rosetta mission, its launch, journey, scientific objectives, and instrumentations, as well as the landing scenario on a cometary nucleus. Along the way, the author presents general questions concerning the origin of terrestrial water and the molecular beginnings of life on Earth, as well as how the instruments used on
