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Nota di contenuto	Organic Matter in the Universe; Contents; Preface; Abbreviations; Color Plates; 1 History and Introduction; 1.1 Origin of Chemical Elements; 1.2 Extraterrestrial Organics; 2 The Chemistry of Organic Matter; 2.1 Families of Organic Molecules; 2.2 Different Forms of Carbon; 2.2.1 Graphite; 2.2.2 Diamond; 2.2.3 Fullerenes; 2.2.4 Nanotubes and Fullerene Onions; 2.2.5 Carbynes; 2.2.6 Amorphous Forms of Carbon; 2.3 Molecules of Biological Significance; 2.3.1 Carbohydrates; 2.3.2 Lipids; 2.3.3 Proteins; 2.3.4 Nucleic Acids; 2.4 Summary; 3 Interstellar Molecules 3.1 Electronic, Vibrational, and Rotational Structures of Molecules 3.1.1 Electronic Transitions; 3.1.2 Vibrational Transitions; 3.1.3 Rotational Transitions; 3.1.4 Effects of Electron and Nuclear Spins; 3.2 Hydrocarbons; 3.3 Alcohols; 3.3.1 Methanol; 3.3.2 Vinyl Alcohol; 3.4 Carboxylic Acids; 3.5 Aldehydes and Ketones; 3.5.1 Formaldehyde;

3.5.2 Cyanoformaldehyde; 3.5.3 Acetaldehyde; 3.5.4 Propynal, Propenal and Propanal; 3.5.5 Ketene; 3.5.6 Acetone; 3.6 Ethers and Esters; 3.7 Amines, Nitriles, and Nitrogen-Containing Molecules; 3.7.1 Ammonia; 3.7.2 Hydrogen Cyanide; 3.7.3 Methylenimine 3.7.4 Methylamine3.7.5 Cyanamide; 3.7.6 Formamide; 3.7.7 Acetamide; 3.7.8 Ketenimine; 3.7.9 Amino Acetonitrile; 3.8 Radicals; 3.8.1 CH; 3.8.2 CH<sup>+</sup>; 3.8.3 The Methylene Radical; 3.8.4 Methyl Radical; 3.9 Carbon Chains; 3.9.1 Carbynes; 3.9.2 Carbon Chain Ions; 3.9.3 Pure Carbon Chains; 3.10 Acetylene Derivatives; 3.11 Rings; 3.11.1 Propynl; 3.11.2 Cyclopropenylidene; 3.11.3 Cyclopropenone; 3.11.4 Ethylene Oxide and Propylene Oxide; 3.12 Phosphorus Containing Molecules; 3.12.1 PH; 3.13 Polycyclic Aromatic Hydrocarbons; 3.14 Molecules Containing Trace Elements; 3.14.1 Metal Hydrides  
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7.9 Trans-Neptunian Objects

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#### Sommario/riassunto

Authored by an experienced writer and a well-known researcher of stellar evolution, interstellar matter and spectroscopy, this unique treatise on the formation and observation of organic compounds in space includes a spectroscopy refresher, as well as links to geological findings and finishes with the outlook for future astronomical facilities and solar system exploration missions. A whole section on laboratory simulations includes the Miller-Urey experiment and the ultraviolet photolysis of ices.

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