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Geometry of chemical graphs. Polycycles and two-faced maps. (English)

Encyclopedia of Mathematics and its Applications 119. Cambridge: Cambridge University Press. x, 306 p. £ 55.00 (2008). ISBN 978-0-521-87307-9/hbk

The book is devoted to the study of the structure of planar graphs that are used as models of organic chemical compounds and also in crystallography. A special interest is paid to two classes of planar graphs; two-faced maps and polycycles. Polycycles are defined as 2-connected planar graphs having prescribed combinatorial type of interior faces with the same degree q for interior vertices, and at most q for vertices on the boundary. Two-faced maps are regular graphs with at most two types of faces. A special subclass of two-faced maps are fullerenes, the most studied class of maps in recent years in chemical graph theory.

First two chapters of the book contain a general introduction to the topological graph theory. The remaining text of the book is organized as 17 almost independent chapters describing special classes of chemical graphs. Chapters are mostly ended with catalogues that contain pictures of graphs. These catalogues can serve as an atlas for graphs that are used in chemical applications. The book can serve as an introduction to the study of chemical graph theory as well as the reference of known results and state of the art on this topic.

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Classification :

∗05C90 Appl. of graph theory

05C10 Topological graph theory

92E10 Molecular structures