Isomorph Encyclopedia Article

Isomorph

The following sections of this BookRags Literature Study Guide is offprint from Gale's For Students Series: Presenting Analysis, Context, and Criticism on Commonly Studied Works: Introduction, Author Biography, Plot Summary, Characters, Themes, Style, Historical Context, Critical Overview, Criticism and Critical Essays, Media Adaptations, Topics for Further Study, Compare & Contrast, What Do I Read Next?, For Further Study, and Sources.

(c)1998-2002; (c)2002 by Gale. Gale is an imprint of The Gale Group, Inc., a division of Thomson Learning, Inc. Gale and Design and Thomson Learning are trademarks used herein under license.

The following sections, if they exist, are offprint from Beacham's Encyclopedia of Popular Fiction: "Social Concerns", "Thematic Overview", "Techniques", "Literary Precedents", "Key Questions", "Related Titles", "Adaptations", "Related Web Sites". (c)1994-2005, by Walton Beacham.

The following sections, if they exist, are offprint from Beacham's Guide to Literature for Young Adults: "About the Author", "Overview", "Setting", "Literary Qualities", "Social Sensitivity", "Topics for Discussion", "Ideas for Reports and Papers". (c)1994-2005, by Walton Beacham.

All other sections in this Literature Study Guide are owned and copyrighted by BookRags, Inc.

Contents

Isomorph Encyclopedia Article.....1

Contents.....2

Isomorph.....3

Isomorph

Crystalline substances with chemical formulas that are similar, and with positively charged cations and negatively charged anions that are similar in size, may form **crystals** with the same structure. These isomorphous groups can be used in mineral classification.

One example is the halite group, which includes halite (NaCl), fluorite (CaF_2), and sylvite (KCl), among other **minerals**. The crystals that they form belong to the isometric crystal system, in which the unit cells (the smallest component of a crystal, which can repeat indefinitely in three dimensions) all have three axes of equal length oriented at angles of 90° to each other. Another example of an isomorphous group is the calcite group, which includes the carbonate minerals calcite ($CaCO_3$), magnesite ($MgCO_3$), rhodochrosite ($MnCO_3$), siderite ($FeCO_3$), and smithsonite ($ZnCO_3$). All of these minerals form crystals with the same symmetry, in this case in the hexagonal crystal system, where the unit cells of the crystals have three horizontal axes of equal length and one axis of different length, perpendicular to the other three. Sometimes, different minerals will have the same chemical composition (a situation called polymorphism). Aragonite has the same chemical composition as calcite, but crystallizes in the orthorhombic crystal system (where the unit cells have three axes of unequal length oriented at angles of 90° to each other). The aragonite group includes the minerals cerussite ($PbCO_3$), strontianite ($SrCO_3$), and witherite ($BaCO_3$). Similarity in cation and anion size is more important than chemical composition in isomorphism. Thus, uraninite (UO_2) and chlorargyrite (AgCl) both belong to the halite group, although their composition and properties are very different. In a solid solution, an isomorphous group of minerals exhibits of a range of mineral compositions between two end members. The **olivine** group forms such a **solid solution series** in the orthorhombic crystal system. The composition of olivine is usually given as $(Mg, Fe)_2SiO_4$, but it can range from pure forsterite (Mg_2SiO_4) to pure fayalite (Fe_2SiO_4). Isomorphism is also called isostructuralism.

See Also

Crystals and Crystallography