Handbook of Sol-Gel Science and Technology

Processing, Characterization and Applications

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This completely updated and expanded second edition stands as a comprehensive knowledgebase on both the fundamentals and applications of this important materials processing method. The diverse, international team of contributing authors of this reference clarify in extensive detail properties and applications of sol-gel science and technology as it pertains to the production of substances, active and non-active, including optical, electronic, chemical, sensor, bio- and structural materials. Essential to a wide range of manufacturing industries, the compilation divides into the three complementary sections: Sol-Gel Processing, devoted to general aspects of processing and recently developed materials such as organic-inorganic hybrids, photonic crystals, ferroelectric coatings, and photocatalysts; Characterization of Sol-Gel Materials and Products, presenting contributions that highlight the notion that useful materials are only produced when characterization is tied to processing, such as determination of structure by NMR, in-situ characterization of the sol-gel reaction process, determination of microstructure of oxide gels, characterization of porous structure of gels by the surface measurements, and characterization of organic-inorganic hybrid; and Applications of Sol-Gel Technology, covering applications such as the sol-gel method used in processing of bulk silica glasses, bulk porous gels prepared by sol-gel method, application of sol-gel method to fabrication of glass and ceramic fibers, reflective and antireflective coating films, application of sol-gel method to formation of photocatalytic coating films, and application of sol-gel method to bioactive coating films. The comprehensive scope and integrated treatment of topics make this reference volume ideal for R&D scientists and engineers across a wide range of disciplines and professional interests.

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