

Solution Combustion Synthesis of Nanoscale Materials



Solution combustion is a phenomenon that involves propagation of self-sustained exothermic reactions along an aqueous or gel media. This process allows for the synthesis of a variety of nanoscale materials, including oxides, metals, alloys, and sulfides. This Invited Review article focuses on the analysis of new approaches and results in the field of solution combustion synthesis. Thermodynamics and kinetics of reactive solutions used in different chemical routes are considered, and the role of process parameters is discussed, emphasizing the chemical mechanisms that are responsible for rapid self-sustained combustion reactions. Recently developed improvements that lead to the formation of novel materials and unique structures such as thin films and coatings with unusual properties are outlined. These materials may be important for energy conversion as well as storage, new optical devices, catalysts, and nano-ceramics.

