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of an External Gas Phase; 2.1.3.2 In Situ Gas Evolution; 2.1.3.3 Gelation; 2.1.3.4 Ceramic Foam Structure; 2.1.4 Other Techniques; 2.1.6 Summary; 2.2 Honeycombs; 2.2.1 Introduction; 2.2.2 Forming the Honeycomb Geometry; 2.2.2.1 Background 2.2.2.2 Honeycomb Extrusion Die 2.2.2.3 Nonextrusion Fabrication Processes; 2.2.3 Composition; 2.2.3.1 Paste; 2.2.3.2 Mixing; 2.2.3.3 The Binder; 2.2.4 Thermal Processing; 2.2.4.1 Diffusion: Drying and Debinding; 2.2.4.2 Melt Manipulation; 2.2.4.3 Sinter Shrinkage Manipulation; 2.2.5 Post-Extrusion Forming; 2.2.5.1 Reduction Extrusion; 2.2.5.2 Hot Draw Reduction; 2.2.6 Summary; 2.3 Three-Dimensional Periodic Structures; 2.3.1 Introduction; 2.3.2 Direct-Write Assembly; 2.3.3 Colloidal Inks; 2.3.4 Ink Flow during Deposition; 2.3.5 Shape Evolution of Spanning Filaments 2.3.6 Direct-Write Assembly of 3D Periodic Structures 2.3.7 Summary; 2.4 Connected Fibers: Fiber Felts and Mats; 2.4.1 Introduction; 2.4.2 Oxide Fibers; 2.4.2.1 Melt-Blown Silica Fibers; 2.4.2.2 Blown Alumina-Silica Fibers; 2.4.2.3 Drawn Alumina-Borosilicate Fibers; 2.4.3 Fiber Product Forms; 2.4.3.1 Continuous Monofilaments; 2.4.3.2 Fiber Mat; 2.4.3.3 Bulk Fiber; 2.4.4 High-Performance Insulation for Space Vehicles; 2.4.4.1 Rigid Space Shuttle Tiles; 2.4.4.2 Flexible Insulation Blankets; 2.4.4.3 Innovations in Thermal Protection Systems; 2.4.5 Summary; 2.5 Microcellular Ceramics from Wood 2.5.1 Introduction 2.5.2 Fabrication of Porous Biocarbon Templates; 2.5.3 Preparation of Carbide-Based Biomorphous Ceramics; 2.5.3.1 Processing by Silicon-Melt Infiltration; 2.5.3.2 Gas-Phase Processing; 2.5.4 Preparation of Oxide-Based Biomorphous Ceramics; 2.5.5 Summary; 2.6 Carbon Foams; 2.6.1 Introduction; 2.6.2 History; 2.6.3 Terminology; 2.6.3.1 Carbon; 2.6.3.2 Graphite; 2.6.3.3 Graphitization; 2.6.3.4 Foam; 2.6.4 Foaming Processes; 2.6.4.1 Thermosetting Precursors; 2.6.4.2 Thermoplastic Precursors; 2.6.5 Properties of Carbon and Graphite Foam; 2.6.6 Summary; 2.7 Glass Foams 2.7.1 Introduction

Sommario/riassunto

Cellular ceramics are a specific class of porous materials which includes among others foams, honeycombs, connected fibers, robocast structures and assembled hollow spheres. Because of their particular structure, cellular ceramics display a wide variety of specific properties which make them indispensable for various engineering applications. An increasing number of patents, scientific literature and international conferences devoted to cellular materials testifies to a rapidly growing interest of the technical community in this topic. New applications for cellular ceramics are constantly being