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Abstract

It is widely known that increasing interest in porous ceramics is due to their special properties, which comprise high volumetric porosity (up to 90%) with open or closed pores, and a broad range of pore sizes (micropores: d < 2 nm; mesopores: 50 nm > d > 2 nm and macropores: d > 50 nm). These properties have many uses comprehending macroscaled devices, mesoscaled materials and microscaled pieces. During their usage, these materials are usually submitted to thermal and/or mechanical loading stresses. Therefore, it is a premise to understand how these porous structures behave under thermomechanical stresses to design materials that show adequate properties for the required application. In this context, the aim of this chapter is to review the mechanical properties of macroporous ceramics.

Keywords: porous ceramics, foams, mechanical properties, elastic modulus, fracture energy

1. Introduction

It is widely known that increasing interest in porous ceramics is due to their special properties, which comprise high volumetric porosity (up to 90%) with open and interconnected or closed and isolated pores, and a broad range of pore sizes (micropores: d < 2 nm; mesopores: 50 nm > d > 2 nm and macropores: d > 50 nm). These properties have many uses comprehending macroscaled devices (filters for liquid metals [1, 2], thermal insulating refractories [3, 4], bio-ceramics for bone regeneration [5–7], filters for water treatment [8], acoustic insulating tiles [9]).