Crystal struture and dielectric characteristics of Ba2-xSr2xMgWO6 perovskites

Ana Senos, Pedro Mantas, Dmitry Khalyavin
University of Aveiro - Portugal

Abstract

Crystal structure and dielectric characteristics of Ba2-2xSr2xMgWO6 perovskites

D.D. Khalyavin, A.M.R Senos, P.Q. Mantas

Department of Ceramics and Glass Engineering, CICECO, University of Aveiro, 3810-193 Aveiro, Portugal

Owing to their ability to form solid solutions in a wide range of compositions, perovskites are intensively explored to obtain materials with controlled properties. In the present work, the crystal structure and the dielectric characteristics of the Ba2-2xSr2xMgWO6 system have been studied. It was found that solid solutions are formed in the whole composition range. An increase of x up to 0.74 results in a continuous structural phase transformation, from a cubic Fm3m to a tetragonal I4/m symmetry, related to the appearance of the a0a0c- anti-phase octahedral tilting. This phase transformation is accompanied by a change in the sign of the temperature coefficient of the dielectric permittivity. Dielectric measurements revealed that the permittivity increases with x in the cubic solid solutions and decreases in the tetragonal ones. This behaviour is discussed based on the differential of the Clausius-Mossotti equation taking into consideration that the polarizability is a function of the cell volume, chemical composition and tolerance factor.