RELAXATION AND RESONANCE PHENOMENA INVESTIGATIONS IN NEW OXIFLUORIDE CERAMICS

L. BENZIADA - TAÏBI

Institut de Chimie, USTHB, B.P. 32 El-Alia, 16111 Bab-Ezzouar, Algiers, ALGERIA

Phone: 213 2 24 79 12 Fax: 213 2 24 73 11 E-mail: ikra@wissal.dz

Non-conducting ceramics are of increasing importance as the electronics industry is in expanding worldwide. Dielectric ceramics are mainly used as capacitors in integrated circuits and as electrical insulators. The capacitors take up most of the area in modern memory chips. For this application, the most concern characteristics are the dielectric permittivity and the dielectric loss factor. Requirement of greater speed data transmission and dielectric resonators have prompted investigations in crystalline materials at higher and higher frequencies. During the last decade, relaxation and resonance phenomena in the gigahertz region have attracted considerable attention both from theoretical and experimental points of view.

The behaviour of the complex dielectric constant as a function of frequency is quite different for resonance and relaxation. Several theoretical attempts have been made to explain the high frequency dispersion in dielectrics and various models have been suggested, the first one being the Debye method. In practice, the behaviour of most dielectric materials deviates from the Debye response and is described by modified equations.

The talk will be subdivided into a theoretical and an experimental part. In a first time we shall introduce the theory of relaxation and resonance phenomena in an elementary manner. In a second step, a number of chemical and physical experiments performed on new oxifluoride ceramics will be described and the results will be discussed.

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