SIMULATION OF THE POLING OF P(VDF-TrFE) WITH FERROELECTRIC ELECTRODES BASED ON THE PREISACH MODEL

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In this paper, a multi-layered ferroelectric composite is analyzed by using the concepts of the classical Preisach model to describe each constituent material. The results obtained are compared to D-E measurements made in the poling of polyvinylidenefluoride-trifluoroethylene (P(VDF-TrFE)) copolymer film sandwiched between ferroelectric triglycine sulfate crystal (TGS) electrodes. In general, the computer simulations are in good agreement with experimental results.

INTRODUCTION

The Preisach model is a method of calculating the hysteresis behavior in ferromagnetic materials. A few authors, such as Turik[1] and Hwang[2], applied this model to ferroelectric materials. However, we are unaware of the application of this model to ferroelectric composites. This paper is a report of such an attempt. We analyze the D-E response of a multi-layered ferroelectric composite by using the concepts of the classical Preisach model to describe each constituent material. The results obtained are compared to D-E measurements made in the poling of P(VDF-TrFE) with ferroelectric TGS electrodes[3].