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ELASTICITY MODULUS OF COMPOSITES BASED ON DEFORMATION ENERGY

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Ceramics have low mechanical strength and poor processivity but excellent piezo- and pyroelectric characteristics. The deficiencies of ceramics can be minimized by combining them with polymers. PVDF samples with different percentages of bentonite or LiNbO3 were used to obtain composites via “casting,” and the modulus of elasticity (E) of the composites was studied using a specially designed system. This paper presents an alternative method to measure the modulus of elasticity to traction E, which uses the calculation of the deformation energy of the materials, of a uniform cross-section sample. By equating this strain energy to the work performed by applied force F, at a point on the sample, so it has a strain of DL, it is possible to establish a relationship between F and DL whose constant of proportionality depends on E, A, and L. A is the area of the cross section and L is the length of the sample requested for deformation. It was necessary to use a force sensor (FS) and a rotational movement sensor (RMS) to obtain a relationship between F and DL. The advantage of this system compared to the traditional ones is the low cost and practicality in determining E.Based on the results, E decreased with an increasing percentage of bentonite and in the case of LiNbO3 for the percentages of 30% and 35% increases.