

Optimal Design of Polymer Based Piezoelectric Actuator with Varying Thickness and Length Ratios

Authors : Vineet Tiwari, R. K. Dwivedi, Geetika Srivastava

Abstract : Piezoelectric cantilevers are exploited for their use in sensors and actuators. In this study, a unimorph cantilever beam is considered as a study element with a piezoelectric polymer Polyvinylidene fluoride (PVDF) layer bonded to a substrate layer. The different substrates like polysilicon, stainless steel and silicon nitride are tried for the study. An effort has been made to optimize and study the effect of the various parameters of the device in order to achieve maximum tip deflection. The variation of the tip displacement of the cantilever with respect to the length ratio of the nonpiezoelectric layer to the piezoelectric layer has been studied. The electric response of this unimorph cantilever beam is simulated with the help of finite element analysis software COMSOL Multiphysics.

Keywords : actuators, cantilever, piezoelectric, sensors, PVDF

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020