

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Piezoelectric characteristics of PZT thin films on polymer substrate MIN-GYU KANG, YOUNH-HO DO, SEUNG-MIN OH, RHEZA RAHAYU, YIYEIN KIM, CHONG-YUN KANG¹, Korea Institute of Science and Technology, SAHN NAHM, Korea University, SEOK-JIN YOON, Korea Institute of Science and Technology — The goal of piezoelectric energy harvesting is to improve the power efficiency of devices. One of the approaches for the improvement of power efficiency is to apply the large strain on the piezoelectric materials and then many scientists approached using thin films or nano-structured piezoelectric materials to obtain flexibility. However, the conventional thin film processes available for the fabrication of piezoelectric materials as $\text{PbZr}_{0.52}\text{Ti}_{0.48}\text{O}_3$ (PZT) are not compatible with flexible electronics because they require high processing temperatures ($>700^\circ\text{C}$) to obtain piezoelectricity. Excimer laser annealing (ELA) is attractive heat process for the low-temperature crystallization, because of its material selectivity and short heating time. In this study, the amorphous PZT thin films were deposited on polymer substrate by rf-sputtering. To crystallize the amorphous films, the ELA was carried out with various conditions as function of the applied laser energy density, the number of pulse, and the repetition rate. To evaluate the piezoelectric characteristics, piezoelectric force microscopy (PFM) and electrometer are used. As a result, we obtained the crystallized PZT thin film on flexible substrate and obtained flexible piezoelectric energy harvester.

¹Corresponding Author

Min-Gyu Kang
Korea Institute of Science and Technology

Date submitted: 11 Nov 2011

Electronic form version 1.4