

Accepted Manuscript

Bending of a sinusoidal piezoelectric nanoplate with surface effect

Y.S. Li, E. Pan

PII: S0263-8223(15)00893-4

DOI: <http://dx.doi.org/10.1016/j.compstruct.2015.09.047>

Reference: COST 6892

To appear in: *Composite Structures*



Please cite this article as: Li, Y.S., Pan, E., Bending of a sinusoidal piezoelectric nanoplate with surface effect, *Composite Structures* (2015), doi: <http://dx.doi.org/10.1016/j.compstruct.2015.09.047>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Bending of a sinusoidal piezoelectric nanoplate with surface effect

Y.S. Li^{*,a,b}, E. Pan^b

^aCollege of Civil Engineering, Hebei University of Engineering, Handan 056038, PR China

^bDepartment of Civil Engineering, The University of Akron, OH 44325-3905, USA

ABSTRACT

The bending problem of a simply supported piezoelectric nanoplate with surface effect is analyzed via the sinusoidal plate model. The piezoelectric nanoplate is treated as a bulk core plus two surface layers. The effect of the surface piezoelectricity on the effective property of the plate system is modeled by a spring force exerting on the boundary of the bulk core. The governing equations are derived by the variational principle. The effect of the surface effect and electric loading on the displacement, electric potential, stress and electric displacement are numerically presented and some new features are observed which should be of particular interest to the future analysis on nanoplates.

Keywords: Surface effect; Sinusoidal plate theory; Size effect; Bending; Piezoelectric materials

* Corresponding author. E-mail: liyshbue@163.com (Y.S. Li)

Download English Version:

<https://daneshyari.com/en/article/6706275>

Download Persian Version:

<https://daneshyari.com/article/6706275>

[Daneshyari.com](https://daneshyari.com)