

DESIGN AND FABRICATION OF THE NEW-TYPE PIEZOELECTRIC ACTUATOR

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ABSTRACT

Recently, In the piezoelectric ceramic research field has been devoted to the development piezoelectric actuator devices, which exhibit amplified transverse displacement and enhanced load-bearing capability as compared to bulk ceramics. Its form characteristic is analogy the rainbow with the dome-shaped contour, such as "RAINBOW" and "THUNDER". Because of piezoelectric actuators with dome-shaped structure exhibit higher transverse displacement. For this reason, a new method of producing ultra-high-displacement piezoelectric actuator has been developed, also will then differ from the fabrication of the "RAINBOW" and "THUNDER" type. The piezoelectric composite material can be electroplated with nickel on the metal substrate by electroforming to make the piezoelectric actuators have the dome-shaped structure and add the loading ability. In the process of electroforming, we choose the "High Chloride Nickel Bath". In measurement, calculate the precise dome height and film thickness by image capture software- "Optimas" to gain the relation of time to dome height and film thickness, then, we can calculate the internal stress of the electroforming bath by the internal stress theory of Stoney. Furthermore, we take three pieces of piezoelectric actuator to electroform with different time to confer the influence of electroforming time to displacement performance and loading ability.

Keywords : piezoelectric ; actuator ; electroforming ; internal stress

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