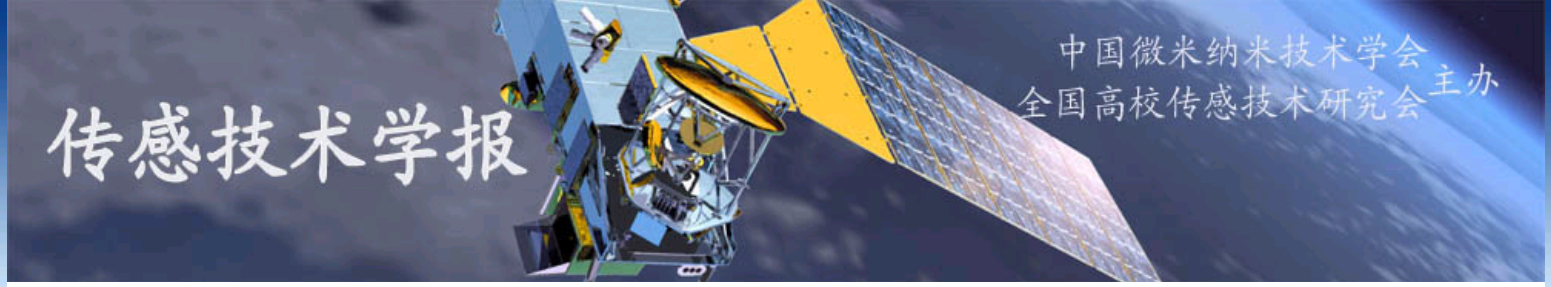

Spherical-cymbal换能器端帽自由胀形过程建模

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摘　要：

为掌握spherical-cymbal换能器端帽自由胀形的成形规律，在端帽材料选定、几何尺寸（包括外径D、空腔底部直径dc和厚度te）及胀形压边力不变且线性加载等约束条件下，采用ANSYS/LS-DYNA软件对几种不同加载终压P下端帽的自由胀形成形过程进行了数值模拟。通过非线性曲线拟合分别得到了加载后端帽中心高度与加载终压（HP - P）、卸载回弹量与加载终压（△H - P）及卸载后端帽中心高度与加载终压（H - P）之间关系的数学模型。实验结果表明，在以上约束条件下，所建数学模型揭示了spherical-cymbal换能器端帽的自由胀形成形规律，可用于指导实际生产。

关键词：spherical-cymbal换能器，端帽，自由胀形，数学模型，数值模拟

Modeling of the Free-bulging Process of Spherical-cymbal Transducer’s End-caps

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Institution:

Abstract:

In order to master the rules of the free bulging process of spherical-cymbal transducer’s end-caps, ANSYS/LS-DYNA software is used to simulate the free-bulging process under the restrictions of selected end-cap’s materials, fixed dimension (including diameter D, cavity bottom diameter dc and thickness te) , fixed blank holder force and linear load. Mathematic models, such as center height after loaded to pressure (HP - P), spring-back to pressure (△H - P) and center height after unload to pressure (H - P), are gained by nonlinear curve fitting. Experiments results prove that these mathematic models can reveal the shaping rules of the free bulging process of spherical-cymbal transducer’s end-caps under the restrictions, and therefore can be used to guide production.

Keywords: spherical-cymbal transducer；end-cap；free-bulging；mathematic model；numerical simulation

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