

## 양방향 마이크로 펌프의 개발 및 성능에 관한 연구

윤재성 · 최종원(서울대 원) · 김민수\*<sup>†</sup>(서울대)**A study on development and performance characteristics of a new bi-directional valveless micropump**

Jae Sung Yoon, Jong Won Choi and Min Soo Kim

**Key Words:** Micropump (마이크로 펌프), Piezoelectric ceramic (압전 세라믹), Valve (밸브), Oblique channel(경사 채널)**Abstract :** A new valveless micropump for bi-directional application has been developed and tested. The micropump was fabricated by micromachining process. The micropump of this study consists of a membrane actuator, a pumping chamber, fluidic channels and two piezoelectric ceramic films. The channels and pumping chamber were etched on a glass wafer and the membrane was made on a silicon wafer which is actuated by a piezoelectric ceramic (PZT) film. The geometry of the micropump was optimized by numerical analysis and the performance of the micropump was investigated by the experiments.

## 고압 원심압축기 설계 및 성능시험

최재호<sup>†</sup> · 한창희 · 팽기석 · 전승배(삼성테크윈) · 김용련(국방과학연구소)**Design and Test of a High Pressure Centrifugal Compressor**

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**Key Words:** Centrifugal Compressor(원심압축기), Performance Test(성능시험).**Abstract :** This paper presents an aerodynamic design, flow analysis and performance test of a pressure ratio 4:1 centrifugal compressor for gas turbine engine. The compressor is made up of a centrifugal impeller, a two-stage diffuser consisted of radial and axial types. The impeller has a 45 degree backswept angle and the design running tip clearance is 5% of impeller exit height. Three-dimensional numerical analysis is performed to analyze the flows in the impeller, diffuser and deswirlers considering the impeller tip clearance. Test module and rig facilities for the compressor stage performance test are designed and fabricated. The overall compressor stage performances as well as the static pressure fields on the impeller and diffuser are measured. Two diffusers of wedge and airfoil types are tested with an impeller. The calculation and test results show that flow fields downstream the deswirlers at the design and off-design points are highly nonuniform and the airfoil diffuser has the better aerodynamic characteristics than those of wedge diffuser.