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Author: Dr. mingming sun  
Lanzhou Institute of Physics, China, smmhappy@163.com

STUDY ON THE LIFETIME ACCELERATING STRESS LEVEL AND ACCELERATED LIFE TEST  
METHOD FOR THE TRIPLE GRIDS OF ION THRUSTER**Abstract**

The current focus in researches of ion thruster have been the working lifetime validation with ion thruster being applied in orbit. Conventional method to validate lifetime costs excessive resources, which also limits the period of thruster manufactures and affects the future application prospects. The concept of accelerated life test for thruster grid components is proposed for the first time in this project, and numerical simulation and experiment validation are used in the project to find the grids' key failure factors and accelerating stress level and also the experiment method for accelerating lifetime. It is planned to analyze the crucial failure mode and study the failure mechanism of 30cm diameter ion thruster. Numerical simulation is also applied to acquire the crucial factor influencing grid lifetime and the accelerating stress level, upon which we also establish a lifetime estimation model of the grids to analyze lifetime in rated working condition and accelerating condition. Ultimately, a 2000h lifetime test of ion thruster working in accelerating condition is conducted to validate the key failure factor, accelerating stress level and experiment method of accelerating test. The result of this project could be applied in the continuing ion thruster lifetime accelerating test and whole life cycle estimation to shorten the original lifetime test period and build a substantial technique basement for fast ion thruster lifetime estimation engineering.