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A NITROGEN RECHARGE SYSTEM FOR CHINA'S MANNED SPACE SCIENCE AND  
UTILIZATION SYSTEM APPLICATION

**Abstract**

A novel Nitrogen recharge system to apply China's Manned Space Science and utilization system is showed in this paper. Nitrogen, chemical formula is named  $N_2$ , is a colorless and odorless gas. In our earth, nitrogen accounted for 78.08%. The gas of nitrogen having typical chemical inertia, it is often used as a protective gas to prevent certain objects from being oxidized when exposed to the air. As the basis of life, Nitrogen is not only the nutrient for chlorophyll, but also the ingredients for protein. With the development of space science and technology, it has come true for human beings and other living creatures on earth to enter space, which brings a lot of new hopes and challenges. Space laboratory and space station have always been the topical field of research, it has great scientific, application and engineering value. China's space station (CSS) will be aimed to leading edge of scientific exploration, human survival and space activities, and will develop extensive experiments of space science technic, and space applications. Nitrogen recharge system is a very important part of space application system because it provides the necessary basic condition for research of China's Manned Space Science and utilization system. Pressurized Nitrogen are used on the CSS for a variety of purposes. Additionally, the CSS program is mandated to maintain a supply of Nitrogen sufficient to repressurize a module in the event of a depressurization. Nitrogen is also used in experiments, The utilization system provides a scientific experimental payloads with nitrogen having specific temperature, stable pressure and flow according to the requirements. The system contains a gas cylinder unit, a control unit, a terminal valve unit, a transducer unit and pipelines. The system is mainly responsible for supplying Nitrogen resource to space payloads. The system of ground test platform was established. The feasibility of the nitrogen recharge system is verified. Nitrogen flow relative flow resistance curve is obtained based on the performance test analysis. Experiment results indicate that the setup is conducted to verify design index requirements. The experimental results were satisfactory and justified the proposed Nitrogen recharge system.