Paper ID: 40332
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MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Fluid and Materials Sciences (2)

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MATERIALS SCIENCE RESEARCH PROGRESS OF THE CHINESE MANNED SPACE PROGRAM

Abstract

The space environment can provide micro-gravity, which is ideal for kinds of materials science experiments. The convection, sedimentation and other effects related with gravity will be significantly weakened, so that the researches on material formation and processing are appropriate to be carried out, which is a supplement for the ground experiments, and promotes the development of new materials science theory and obtain new advanced materials. The space environment can also be used to study the durability and degradation of materials with external playload facility. In China, materials science has been the key research area since the initiation of manned space program. The space crystal growth experiments to grow semiconductor optoelectronic materials, oxide crystals, metal alloys and amorphous alloys had been conducted on SZ-2, SZ-3 and TG-2 space lab. On SZ-7, the materials exposure device was accommodated to study the service behavior of certain materials. All these studies achieved some results and prepared well for the materials experiments on research methods and techniques for China Space Station (CSS). CSS is planning to launch around the year of 2020, and is designed to orbit the earth for more than ten years. The CSS is a larger experiment platform with long-period orbiting and being well taken care of, which is more advantageous for the materials science experiments. Two racks for materials science experiments will be accommodated in the CSS and many kinds of materials science experiments are arranged.