

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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THE DEVELOPMENT PATH STUDY OF ADDITIVE MANUFACTURING IN SPACE ON CHINESE
MANNED SPACECRAFT

Abstract

Components production through additive manufacturing technology under microgravity condition, called space 3D printing, provides an option of producing the required parts on-site and on-demand in space. China is building its own space station and plans to put it into operation around 2020. The application of space 3D printing can reduce the amount of spare parts effectively to save more valuable room and resource. Also, as one of the important and necessary technologies for future manned deep space exploration, space 3D printing should be developed in advance. Several institutes in China have started the research in this field and gained some success and experience. The parabolic flight additive manufacturing experiment has been carried out in April 2016. China plans to develop the space 3D printing technology based on the demand of the space station mission and future manned space exploration mission. The first step is to study the microgravity effects on the additive manufacturing by plastic and other organic materials and achieve the recycle of plastic material in space station. The following step is to develop some advanced space 3D printing methods for composite materials and metals to realize the on-site production of metal and electronic parts. The last step and the long term objective are to obtain the microgravity 3D printing technologies to support the future utilization of in-situ resource on other planets.