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Curing of large size construction for space exploitation

Space exploitation is impossible without large space structures. We need to make sufficient large volume of pressurized protecting frames for crew, passengers, space processing equipment, & etc. We have to be unlimited in space.

Now the size and mass of space constructions are limited by possibility of a launch vehicle. It limits our future in exploitation of space by humans and in development of space industry.

Large-size space construction can be made with using of the curing technology of the fibers-filled composites and a reactionable matrix applied directly in free space. For curing the fabric impregnated with a liquid matrix (prepreg) is prepared in terrestrial conditions and shipped in a container to orbit. In due time the prepreg is unfolded by inflating. After polymerization reaction, the durable construction can be fitted out with air, apparatus and life support systems.

Our experimental studies of the curing processes in the simulated free space environment showed that the curing of composite in free space is possible. The large-size space construction can be developed.

A project of space station, Moon base, Mars base, mining station, interplanet space ship, telecommunication station, space observatory, space factory, antenna dish, radiation shield, solar sail is proposed and overviewed. The study was supported by Humboldt Foundation, ESA (contract 17083/03/NL/SFe), NASA program of the stratospheric balloons and RFBR grants (05-08-18277, 12-08-00970 and 14-08-96011).

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