saving of sufficient mechanical properties of the substrate (ultimate tensile strength is about 400—500 MPa at 800°C). The coatings have been formed by detonation spraying.

A special device will be designed to test the new material samples for fatigue strength. This unit consists of the loading device mounted on the outer side of the ISS, and of the automatic control and recording systems placed inside the ISS. The loading device is a carousel-type holder with 15 specimens, which are subsequently loaded in a cycle. Loading rollers are arranged in two circular rows in such a manner that the free ends of plane specimens are clipped for bending between them. The loading device is driven to rotation by a motor. The automatic control system records the holder revolutions, temperature, and time by the signal transducers mounted on the loading device.

«Accumulator» Sub-Experiment of the «Resource» Experiment
PROPERTIES OF METAL HYDRIDES UNDER MICROGRAVITY

Trefilov V. I., Schur D. V.

I. N. Frantsevich Institute for Materials Science Problems, NAS of Ukraine
3 Krzhyzhanovsky St., Kyiv 03142 Ukraine
tel: (380) + 44 +444 22 71, fax: (380) +44 +444 03 81, e-mail: shurzag@ipms.kiev.ua

The purpose of the experiment is to study the effect of microgravity on performance of energy conversion systems and other apparatuses based on metal hydride materials. This experiment also involves a study of hydrogen-sorbing materials production in space and of their physical and chemical properties. Such materials may be widely used in the future to design the space hydrogen power devices.

These data will be compared with the data obtained on the ground under the gravity conditions.

Experiment program includes the following stages:

- study of the peculiarities of the process of production of hydride-forming alloys;
- study of the influence of microgravity on physical-chemical transformations arising in application of hydrogen energy equipment;
- design, development, fabrication and testing of metal hydride storage facilities for hydrogen transformation and use onboard the OSS to perform scientific experiments;
- study of fatigue life, hydrogen capacity, structural and phase characteristics of alloys and of products of their interaction with hydrogen;
- production of various fullerenes under microgravity;
- comparative study of heat mass transfer and thermal-physical properties of metal hydride powders under the conditions of full gravity and microgravity;
- study of the influence of microgravity on the performance of a metal hydride electrode for batteries.

This work is carried out in wide co-operation with the institutions and laboratories in Ukraine (IPMS NASU; Institute for Problems in Machinery, NASU; State Scientific Industrial Enterprise «Zirconium»), Russia (Institute of New Chemical Problems, RAS; Institute of Chemical Physics, RAS), the USA (University of Central Florida; Allied Signal Inc. Aerospace Equipment Systems; Eastern Europe Linkage Institute), Canada (Ecole Polytechnique de Montreal), and Germany (Institute for Nuclear Energy and Energy Systems of the University of Stuttgart).