

Reviewer report

Title: Research on Cosmic Matter on the Earth and in Space; Research on the Biological and Geochemical Specifics of the Early Earth

The proposal submitted by the Astrobiology Sector of the Laboratory of Radiation Biology (JINR) focuses on four topics, the study of microfossils and organic compounds in meteorites and ancient terrestrial rocks, the synthesis of complex prebiotic compounds from formamide under exposure to radiation with the involvement of meteorites, the bio-geochemical study of cosmic dust, and Cosmic matter research with nuclear physics methods. The four topics are introduced in detail and full described.

– scientific merits and intellectual contribution;

the project is a continuation of a previous program, started in 2013, with the support of the Scientific Council on Astrobiology at the Presidium of the Russian Academy of Sciences: "Biogeochemical Research on Cosmic Matter on the Earth and in Space; Research on the Biological and Geochemical Specifics of the Early Earth". The objectives of the proposal are well defined, they encompass the main topics of Astrobiology, including the formation of the first prebiotic compounds, the presence of biomarkers in meteorites and other no terrestrial materials, the mineralogical origin and elemental (isotopical) composition of meteorites and cosmic dusts; extreme forms of life (extremophile organisms), and micropaleontological studies of terrestrial rocks. The project has already led to different significant results described in nine National and International conferences and Proceedings, one book, six publication in English language and three publication in Russian language. Among the magazines in English language, Nature Scientific Report is characterized by the highest impact factor.

– technical feasibility of the project within the proposed timescale;

The technical feasibility for the project is accurately described (e.g. gas chromatography associated to mass spectrometry GC/MS, Scanning Electron Microscopy, energy dispersive X-ray spectrometry, etc.), including specific JINR facilities such as multi-element neutron activation analysis (NAA) at the IBR2 reactor, IREN neutron spectrograph, and neutron tomography methods. A specific MySQL web-oriented database has been developed. Overall, the technical feasibility of the project appears to be adequate for achieving all the proposed objectives within the indicated timescale. External collaborations (e.g. Biophotonics Laboratory of the Institute of Electronics, the Bulgarian Academy of Sciences) further implemented the feasibility of the proposal.

– compliance of the requested financial resources with the project objectives;

The GAANT of the project (work schedule) is described in detail. Either ground-stated and space-stated (Bion-M spacecraft) experiments are planned. The requested financial source (130,000 USD for three years) is completely adequate for the suggested work plan, it includes the construction and equipment of a block of clean and cold rooms.

– availability of adequate human resources at JINR and in the collaborating institutions."

The human resources at JINR and in the collaborating institutions are full adequate for the feasibility of the project.