Atmospheric Deposition of Cosmic Dust Studied by the Moss and Trepel Analysis

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It is well established phenomenon that extraterrestrial dust particles and micrometeorites survive atmospheric entry and reach the Earth's surface. Collection of extraterrestrial dust for research focuses on the environments where terrestrial sedimentation rates and input of artificial particles of anthrogenic origin is minimal, including deep-sea sediments, Antarctic ice and snow, as well as natural planchettes of mosses and peat-bog cores. Experimental observations of particles considered as cosmic dust are presented in moss samples (*Sanionia uncinata*) collected in King George Island [1], *Pleurozium Shreberi* in highlands of Georgia [2], the same in Tver Region of Russia, and newly obtained results on cosmic dust in Arctic, as well as trepel (a loose or weakly cemented fine-porous opal sedimentary rock composed of diatom and radiolarian skeletons) from the lowlands of Belarus [3] are presented. Microanalysis of moss samples showed the presence of clastic, anthropogenic particles and particles of cosmic dust. The identification of particles as micrometeorites is achieved on the basis of their compositional, mineralogical, and texture analyses using SEM microscopy/EDAX techniques and neutron activation analysis (NAA). The majority of particles undergo melting during their passage of the atmosphere. Most abundantly, particularly at large sizes, cosmic spherules (i.e. completely melted droplets) were observed. These spherical particles provide a useful proxy for the total flux of cosmic dust because they are relatively easy to identify. They are the background magnetic component of cosmic dust, mainly microspheres and particles of native metals. Most often, it was possible to detect native Fe, Fe-Ni and Fe-Cr minerals.

Keywords: cosmic dust, SEM microscopy/EDAX techniques, neutron activation analysis

References

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