Joint Institute for Nuclear Research

NEUTRON SPECTROSCOPY, NUCLEAR STRUCTURE, RELATED TOPICS

XIX International Seminar on Interaction of Neutrons with Nuclei

Dubna, May 25–28, 2011

Abstracts of the Seminar

Dubna 2011

УДК 539.125.5(042)
ББК 22.383.2я431+22.383.5я431+22.383.25я431
N50

The contributions are reproduced directly from the originals presented by the Organizing Committee.

Neutron Spectroscopy, Nuclear Structure, Related Topics: Abstracts of the XIX N50 International Seminar on Interaction of Neutrons with Nuclei (Dubna, May 25–28, 2011). — Dubna: JINR, 2011. — 81 p.
ISBN 978-5-9530-0281-3

Нейтронная спектроскопия, структура ядра и связанные вопросы: Тезисы докладов XIX Международного семинара по взаимодействию нейтронов с ядрами (Дубна, 25–28 мая 2011 г.). — Дубна: ОИЯИ, 2011. — 81 с.
ISBN 978-5-9530-0281-3

УДК 539.125.5(042)
ББК 22.383.2я431+22.383.5я431+22.383.25я431

ISBN 978-5-9530-0281-3

ACTIVE BIOMONITORING OF TRACE ELEMENTS ATMOSPHERIC DEPOSITION IN URBAN AREA USING MOSS *Sphagnum girgensohnii* Russow

Aničić M.[1], Tomašević M.[1], Frontasyeva M.[2]

[1]*Institute of Physics, University of Belgrade, 11080 Belgrade, Serbia*
[2]*Frank Laboratory of Neutron Physics, JINR, 141980 Dubna, Russia*

The use of native moss as biomonitors is a convenient way of determining levels of heavy metals atmospheric deposition, as an alternative to instrumental monitoring techniques. To clarify the peculiarities on the influence of exposure time on trace element accumulation in moss bags technique (active biomonitoring), moss *Sphagnum girgensohnii* Rusow were exposed in the urban area of Belgrade. Moss was exposed in bags (dry and wet) at several representative urban sites for five 3-months periods (July, 2005-October, 2006), as well as, at one sub-urban site for 15 days up to 5 months, in consecutive 15 days periods (July-November, 2007) to examine effects of spatial and temporal variations of the trace elements atmospheric concentration on their content in the moss tissue. About 60 trace elements were determined in the moss bags samples using three analytical methods (INAA, FAAS, HR-ICP-MS). The moss element accumulation capability was also tested in relation to atmospheric bulk deposition.

The most of the investigated elements showed a statisticaly significant increase of the elements concentration with time regarding the initial content of elements in unexposed moss [1, 2, 3]. However, some physiologically active elements (Na, P, Na, P, Cl, K, etc.) was depleted from moss tissue with time of exposure due to damaging of cell walls and leaking of the elements. A significant correlation between moss and bulk deposition was obtained for some of the elements (especially V and Ni) [2]. Removal of *S. girgensohnii* from the natural habitat is stressful for the moss, expecially in sense of dehidration, so the moss bags in all experiments were exposed in two paralel designs: dry (freely hanging) and wet (above the reservoires with water) moss bags. The majority of measured elements was accumulated more efficiently by wet moss bags (especially Cu, Sr, Zn, Cr, Al, Fe, Pb, Cd) and depletion of physiologically active elements was diminished comparing to dry ones. Aiming to estimate the physiological condition of the exposed moss, the concentrations of the photosynthetic pigments (chlorophyll *a* and *b*; index chlorophyll *a*/*b*) were determined as well as index of characteristic absorbancies (*A665*/*A665a*) before and after acidification of the pigments extracts. Also an assessment of a stability of the mitochondrial membranes, applying colorimetric triphenyltetrazolium chloride (*TTC*) test, was further made.

According to the obtained results, *S. girgensohnii* Russow moss bags may be applied as an appropriate biomonitor of some trace elements atmosferic deposition in urban areas. Also, wetting of moss bags during exposure period improves accumulation abilities and sensitivity of the moss.

REFERENCES

1. Aničić M. *et al.*, Environ. Chem. Lett. 7 (2009), 55-60.
2. Aničić M. *et al.*, Environ. Pollut. 157 (2009), 673-679.
3. Aničić M. *et al.*, J. Haz. Mat. 171 (2009), 182-188.