

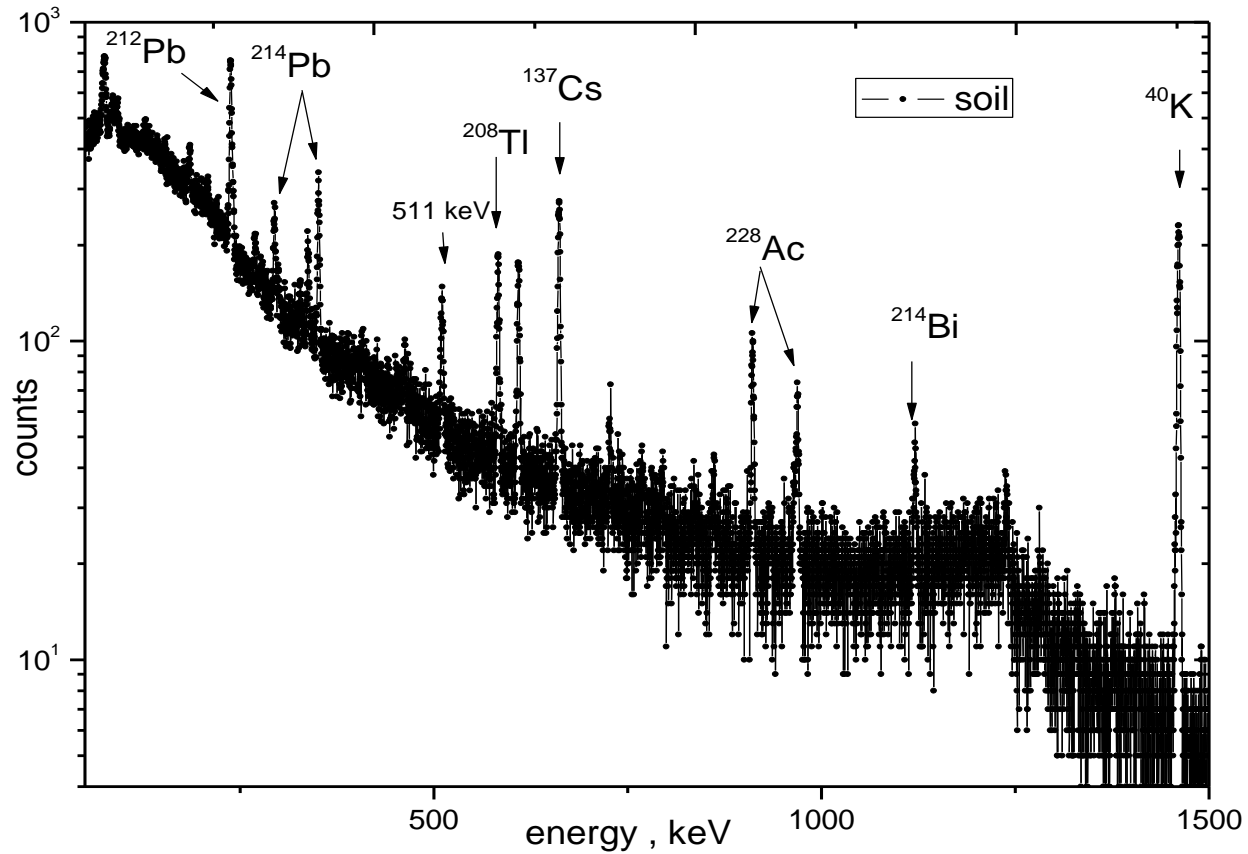
# **ANALYSIS OF URANIUM MOBILITY AND CONCENTRATION PROCESS IN OBJECTS OF ENVIRONMENT AND BIOOBJECTS**

***N.P. Dikiy, E.P. Bereznyak,  
S.M. Kolupayev, Yu.V. Lyashko,  
E.P. Medvedeva, D.V. Medvedev,  
Y.S. Hodyreva***

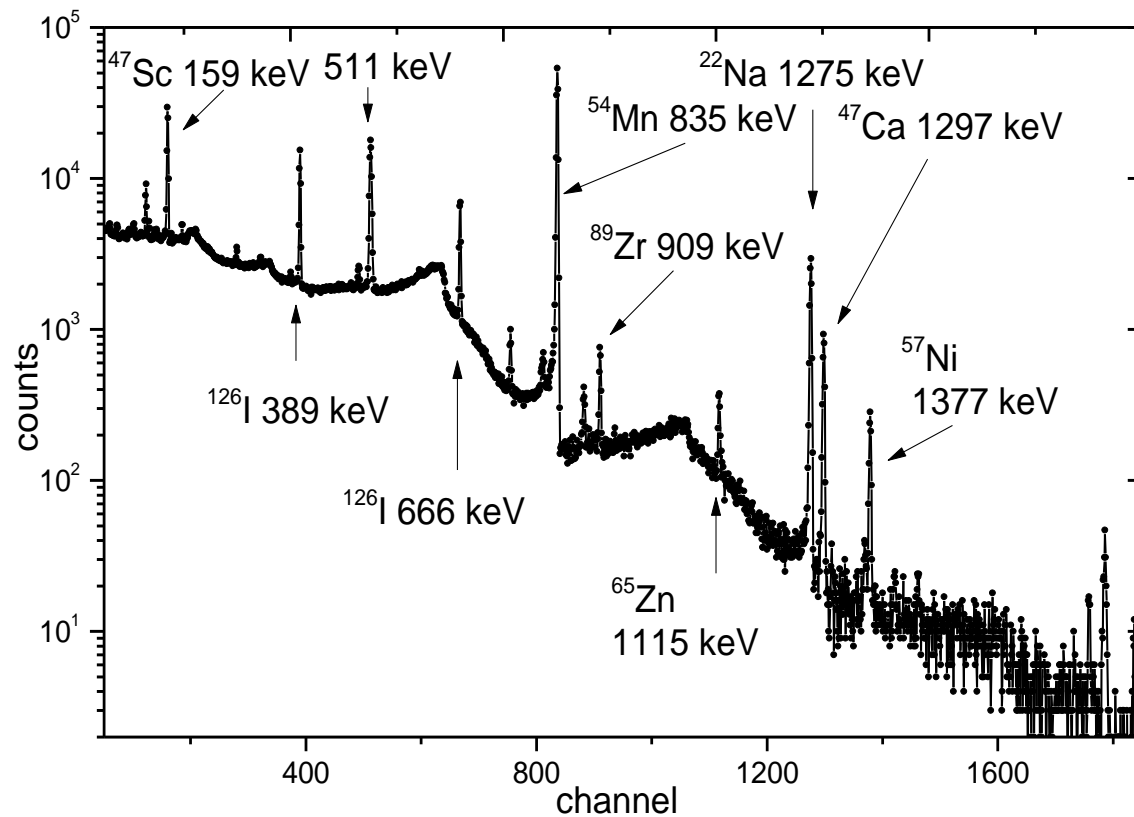
- Проведен гамма активационный анализ на ЛУЭ ННЦ ХФТИ для определения содержания природного урана и удельной активности  $^{235}\text{U}$  в объектах окружающей среды (вода, почва, водном растении (гидрофите), а также в почечных камнях пациентов больницы №17. Во всех исследуемых образцах был обнаружен альфа-излучатель  $^{235}\text{U}$ , который представляет серьезную опасность как для экосистемы, так и для здоровья человека. С помощью ИК-спектроскопии и кристаллооптического анализа было показано, что для жителей Харьковского региона характерно наличие почечных камней смешанного минерального состава, доминирующим компонентом которого является вевеллит (моногидрат оксалата кальция).

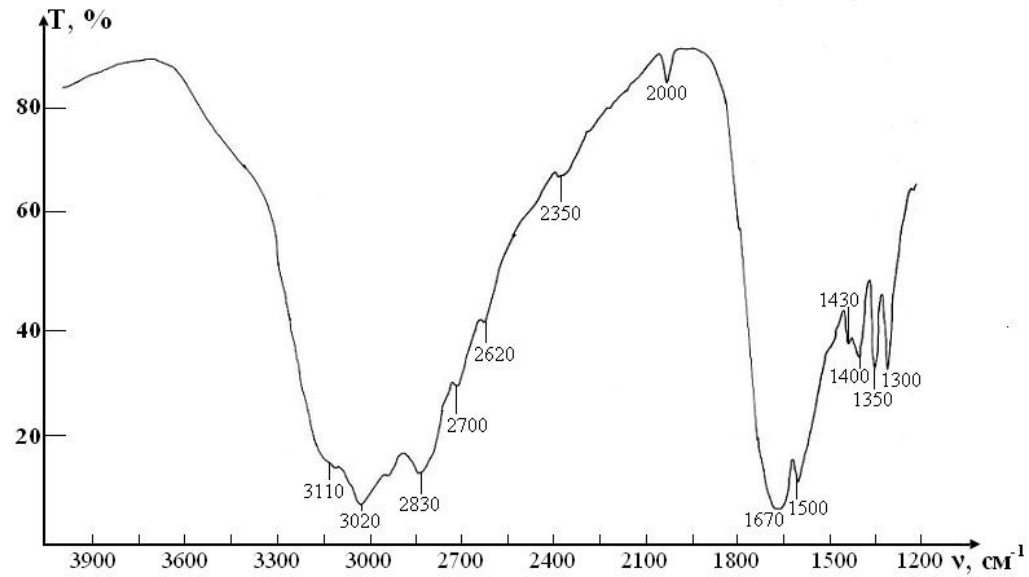
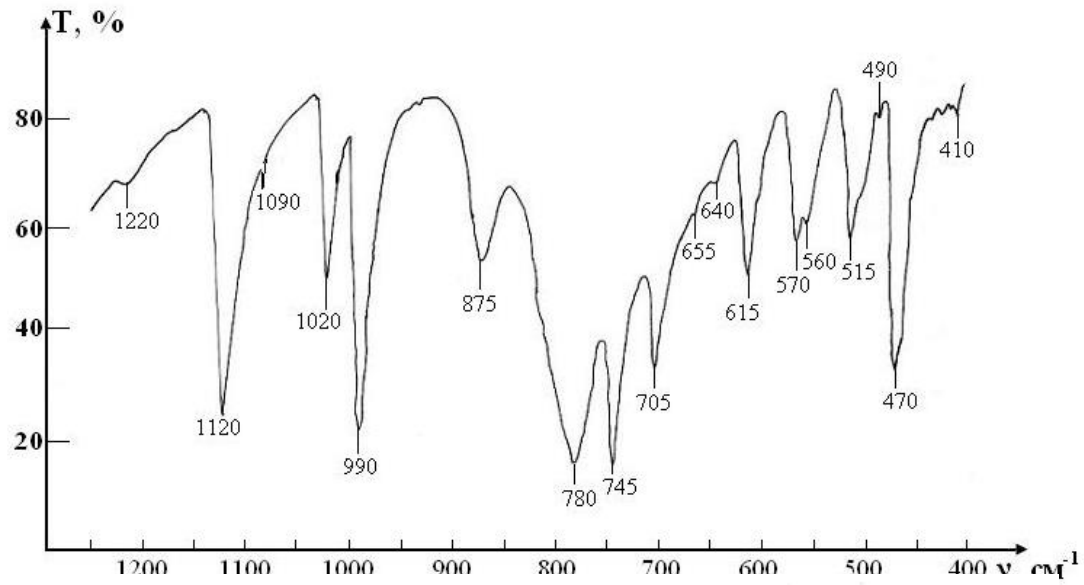
- The specific activity of  $^{235}\text{U}$  and content of native uranium for the Kharkov region in drinking water, soil, of roots and leaf of hydrophyte “*Pistia stratiotes*” and the samples of kidney stones of patients of Regional clinical hospital N17 were measuring by using gamma activation analysis on linac accelerator of NSC KIPT. The whole sample contained alpha-emitter uranium. The IR-spectra of the kidney stones of the Kharkov region patience showed that wavellite (calcium oxalate monohydrate), hydroxyapatite, and uric acid presented.

# *The energy spectrum of soil sample*

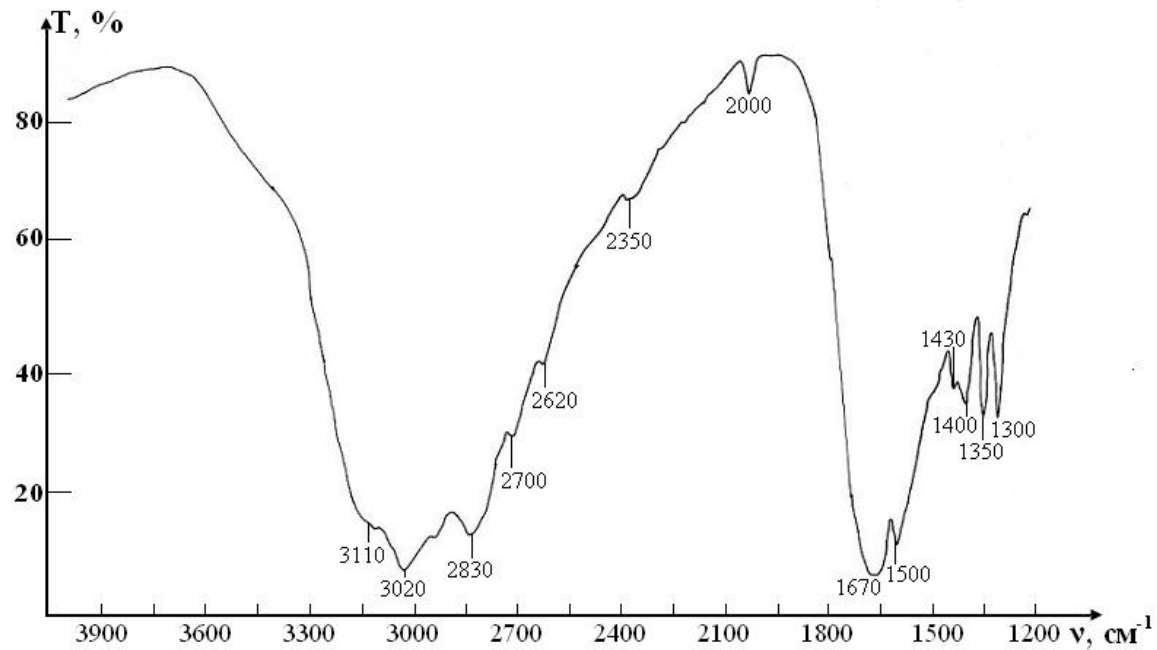
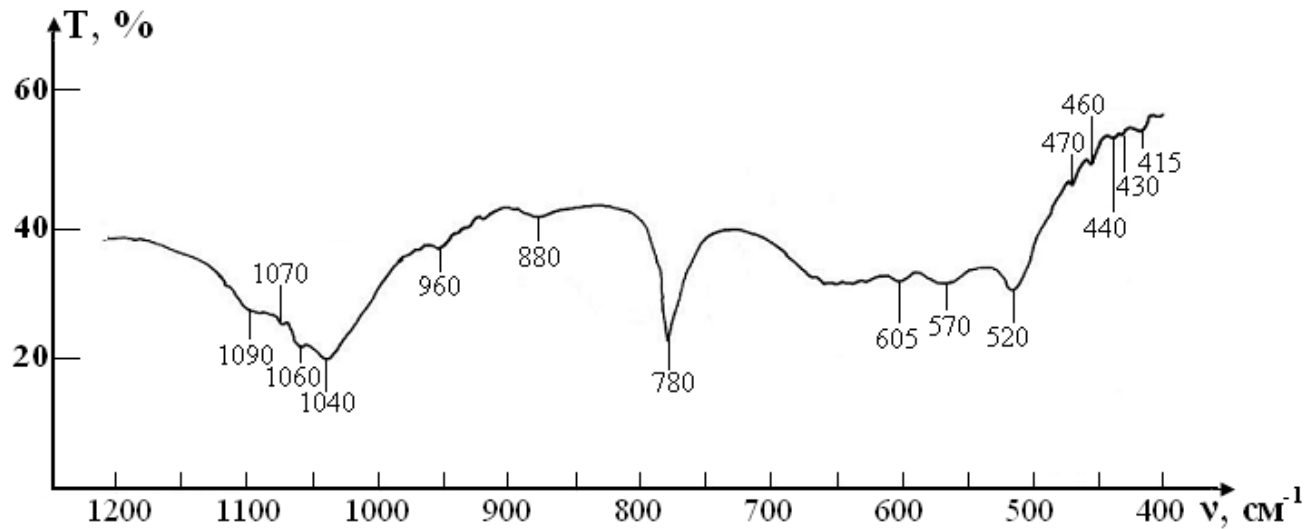


# *The energy spectrum of root *Pistia stratiotes* after irradiation on electron accelerator*



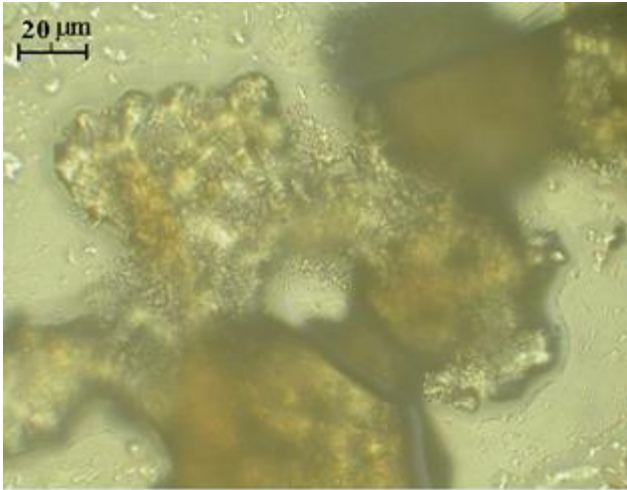


*IR-absorption spectra the sample kidney stones N1*

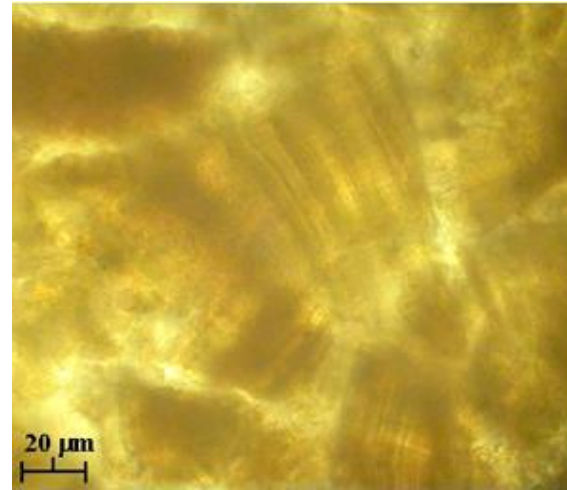


*IR-absorption spectra the sample kidney stones N2*

## Microphotograph of sample N2, N3



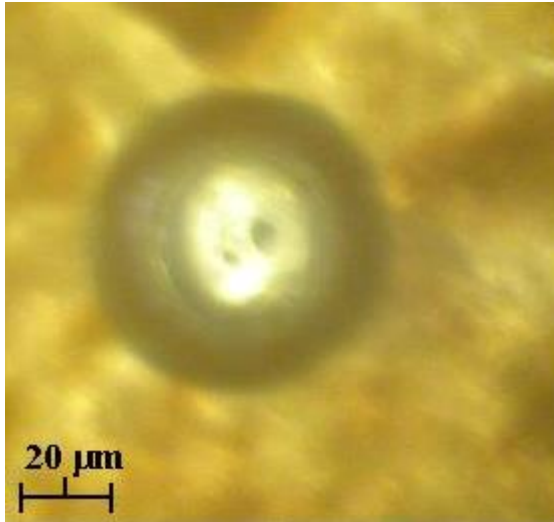
*The microphotograph of sample N2 in immersion liquid in transmitted light. The grain of whewellite with texture of strips. Without analyzer*



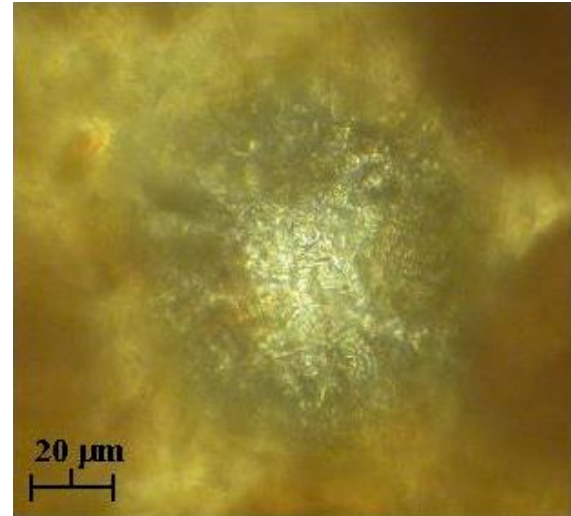
*Microphotograph of sample a kidney stone N3 in immersion liquid in transmitted light. Vevellite grains with a banded texture*



*Microphotograph of sample a kidney stone N3 in immersion liquid in transmitted light. Spherical inclusion*



*Microphotograph of sample a kidney stone N3 in immersion liquid in transmitted light. Spherical inclusion with a polycrystalline center*



- The specific activity of  $^{235}\text{U}$  and content of native U for the Kharkiv region in drinking water, soil, of roots and leaf of hydrophyte "*Pistia stratiotes*", and the samples of kidney stones of patients of Regional clinical hospital N17 carried out by using gamma activation analysis on linac accelerator of NSC KIPT.
- The  $^{235}\text{U}$ ,  $^{238}\text{U}$  activity is one of dangerous actinide. It was registered in whole research samples the following level: for drinking water – from  $1.2 \cdot 10^{-6}$  to  $1.8 \cdot 10^{-6}$  Bq/dm, for soil – 26.6 - 8.9 Bq/kg, for native U in the root of "*Pistia stratiotes*" –  $3.74 \cdot 10^{-6}$  g/g, in the leaf of "*Pistia stratiotes*" –  $5.27 \cdot 10^{-7}$  g/g, the activity of  $^{235}\text{U}$  in the root "*Pistia stratiotes*" –  $2.6 \cdot 10^{-8}$  Bq/kg and at last, for the samples of kidney stones from 1 to 100 ppb.
- The infrared spectral analysis the whole samples have the common feature for all types of kidney stones in patients of the Kharkiv region.
- The level of the uranium in native U and  $^{235}\text{U}$  not exceeds the background value for the Kharkiv region.

- **Спасибо за внимание!**