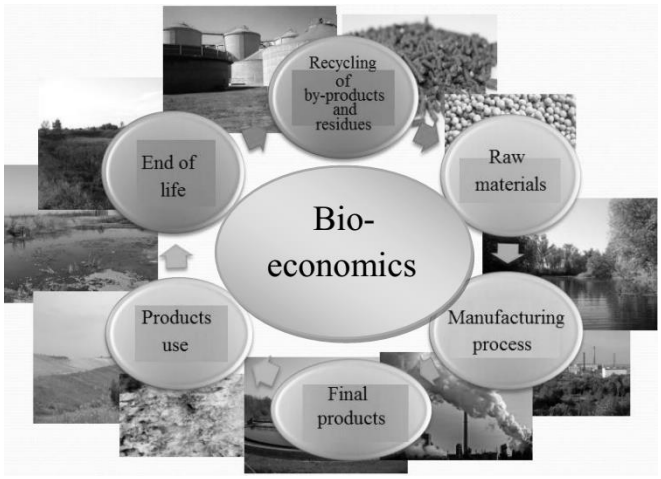

Fig. 1. Life cycle approach to bio-based solutions for processing of secondary resources

The research is based on the use of municipal sewage sludge as carbon substrates and PG as source of nutrients and microelements for cultivated useful groups of microorganisms for bio-fuels and bio-based products. The integrated biotechnological solutions for using and processing of secondary resources include research on biogas purification in bio-desulfurization system with biomethane and bio-sulfur production [2]. The highlight of research is as follows:

– biochemical and mathematical formalization based on the optimization criteria of wastes bio-conversion;

– determination of the values of the process constants taking into account the influence of the biotic component of ecosystem;

– development of the synergetic patterns of the influence of phosphogypsum and sewage sludge as a secondary resources on ecosystem components.

Besides phosphogypsum and sewage sludge can be useful for the extending feedstock basis for the lactic acid fermentation under biopolymers production. They can be useful as cheap carbon sources for fermentation processes and the additional nutrients are important as well in view of an economic feasible entire process.

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DETERMINATION OF MASSES OF THE SUPER HEAVY ELEMENTS IN THE EXPERIMENTS ON SYNTHESIS OF 112 AND 114 ELEMENTS USING THE REACTIONS ^{40}AR + ^{148}SM; ^{40}AR + ^{166}ER; ^{48}CA + ^{242}PU

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The article describes main parts of MASHA (Mass Analyzer of Super Heavy Atoms) facility, chemistry of superheavy elements such as Hg and Rn, main results of completed calibration.

Keywords: island of stability, TIMEPIX detector, hot catcher, target, multy-nucleon transfer reaction.

The MASHA setup designed as the mass-separator with the resolving power of about 1700, which allows mass identification of super heavy nuclides is described and the same time to detect their alpha decay and spontaneous fission. Based on the beam line of Cyclotron U-400M. Constructed as the mass-spectrometer in a large variety of masses (from 1 to 450 (in theory) a.m.u.).

The hot catcher system uses the block of rotating targets, assembled into cassettes. The idea to use rotating target instead stationary are larger surface of target material and better heat distribution.

The disc rotated at the frequency of 25 Hz via Siemens electric engine. Heater is a block which represents thermally expanded graphite heated directly by electric current. This removes the heating losses and irregularity of the heating. The division foil is made from thin graphite foil in connection to its thermal reliability in comparison to previously used titanium foil.

Main problem at studying the properties of nuclei close to the stability frontier is the difficulty of their identification. In this aspect applying the TIMEPIX detector system seems to be a very promising. TIMEPIX has 65536 channels and each has individual ADC and preamplifier.

Mercury is similar to 112 and 114 elements in a row of chemical properties, e.g. with respect to the surface absorption energy, to 112 and 114 elements e.g. volatility so Hg is used for an online calibration of all parts of installation.

Radon is a member of the zero-valence elements that are called noble gases. It is inert to most common chemical reactions, because the outer valence shell is full of electrons. Radon is a naturally occurring radionuclide. Radon is a decay product of radium and part of the uranium and thorium decay chains.

To start the study, the effects of the nuclear shell structure it was decided to perform a first test experiments for production of Rn isotopes in multi-nucleon transfer reaction $^{48}Ca + ^{242}Pu$. The cross-sections of these kinds of reactions are quite high, so it was possible to obtain good statistics.

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WEB RESOURCE AS SYSTEM OF A DISTANCE CONTROL AND MONITORING

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In the era of formation and development of the information society, the main aspect of the functioning of the electronic device is a system of distance control and management, carried out with the help of web resources, web applications, mobile applications, etc.This system allows to keep under control important projects from anywhere in the world where there is access to the world wide web. First of all, distance control and management systems are used in automation systems.

Keywords: distance control, monitoring system, web-resource, single-Board computer, microcomputer.

The system of control and management of the closed water environment is executed as a web resource which includes system of visual monitoring, offices of developers and the control panel. All modules are connected and due to their integration there is a communication with the end user. The system can be divided into several blocks – monitoring system; control and management system; system of private offices

The monitoring system is designed to track information and respond to the system triggers, including parts of a visual component of the presentation of information for a simple and understandable perception. It also allows you to identify the amount of resources saved and increase the commercial benefits of projects. The monitoring and control system allows to distance configure the components of the automation system, sensors and modules in real time. Also in some cases it allows to prevent emergency situations. The system of private offices provides developers with the ability to make changes to the project and operational communication.

The system is based on Raspberry Pi 3B+. Raspberry Pi is a single-Board computer on the architecture of 64-bit ARM processor, designed for teaching computer science, but has received a much wider application in the field of design of automation systems.

The microcomputer is a part of the controlled system. The managed system, being a part of the remote control and access system, provides a higher speed of data acquisition and response to changes. The advantage is the local configuration of both systems at once.

Such advantages as cross-platform, a lot of documentation and compatible components, price and compactness make Raspberry Pi an ideal platform for a development of a control system (Table 1).