

HOW TO REALIZE ALCHEMISTS DREAM?

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Medieval alchemists considered possible transmutation elements and transformation of one elements into others. However at that time chemistry as sciences did not exist yet, and the concept about elements still has not been formulated. Therefore this idea has been connected with problem of reception of gold from ignoble metals by means of miracle means - "a philosophical stone". In a view of modern scientific data clearly, that efforts of the alchemists searched recipes of transformation of one metals in others, could not be successful at that low level of development of a science and at that primitive technics of experiment which alchemists had.

Alchemical recipes of transformation of metals in gold represent descriptions of elementary operations on reception of various alloys or the preparations, disguised by foggy terminology and spells, not clear for not devoted and directed for covering failure in reception of gold.

In 1924 German prof. Meath has informed, that it gold in a mercury-quartz lamp is revealed. Having lead additional experiences, it has come to conclusion, that in known conditions gold can be formed of mercury which before experience has been carefully cleared.

Noted German chemist Frits Gaber has defined, that increase of quantity of gold in mercury in conditions of experiences Meath does not occur. Clearing of mercury of traces of gold is very difficult problem, and in mercury it is necessary to explain occurrence of gold its casual hit from the outside. So, for example, one of employees Gabera during work concerned with a hand of a gold frame of the glasses and it was enough, that in investigated mercury presence of traces of gold was found out. Thus, results of experiences Meath have not proved to be true at check.

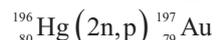
Attempts to realize transmuted metals with the purpose of reception of gold from ignoble metals has not crowned success. Today it is known, that by means of chemical reactions it is impossible to change structure of kernels of elements and accordingly charging number (number of protons) which define nuclear number of an element.

Nevertheless, to carry out dream of alchemists now it is possible by means of the nuclear reactions spent on cyclotrons,

Radiating rare stable isotope Hg196 which maintenance makes only 0,15%, neutrons it is possible to receive radioactive isotope Hg197 in due course half-decay 64,1 hours which as a result of electronic capture turns to a stable isotope of gold Au197.

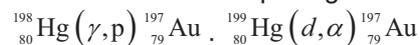


With smaller probability depending on energy of neutrons this reaction can pass under other script:



Irradiating more widespread isotopes of mercury and γ -beams of high energy and deitrons, also it is possible to receive a stable isotope of gold: ${}_{80}^{198}\text{Hg}(\gamma, p) {}_{79}^{197}\text{Au}$; ${}_{80}^{199}\text{Hg}(d, \alpha) {}_{79}^{197}\text{Au}$.

The stable isotope of gold can be received, irradiating targets from metals of platinum group on reactions:



The resulted reactions show, that the stable isotope of gold can be received as a result of nuclear transformations. But for this purpose it is necessary to have highly cleared targets of a concrete isotope that is extremely expensive procedure. If to irradiate a natural mix of 7 stable isotopes with Hg neutrons, as a result of electronic capture β^- -decay on an output except for stable Au197 we shall receive a mix of isotopes of mercury and two stable isotopes Tl203 and Tl205. Targets from platinum metals cost much more dearly, than received gold. Power charges of reception of isotopes on a cyclotron are so great, that cost of reception of a stable isotope of gold and its clearing on some orders exceeds charges of its reception in the traditional industrial way. The nuclear reactions resulted in work now represent only scientific interest and belief that dream of alchemists to carry out probably, but is not expedient!

The literature:

[1] Chemistry: the Encyclopedia of chemical elements. M.: Drofa, 2000.

[2] J. Magill, J. Galy. Radioactivity. Radionuclides. Radiation. Spiringer-Verlag Berlin Heidelberg and European Communities 2005.

[3] www.webelements.com

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