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Experiments on Claimed Transmutation of Elements Caused by a Chemical Process

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Abstract — Results are presented for neutron activation analysis of a mixture of several chemicals before and after burning. The experimental results do not show any unexpected appearance of new elements after burning of the mixture.

Introduction

In a recent publication, Bockris and collaborators have reported unexpected effects during burning of a mixture of chemicals (Lin *et* al., 1995). In this paper we present some experimental results of our studies with regard to claimed creation, as the result of a chemical process, of elements different from those initially present in the sample.

In previously published papers (Noninski *et* al., 1995a,b), we have studied some other aspects of claimed nuclear effects due to chemical processes, such as increase of y-ray emission after burning and β decay after burning. This communication is intended to wrap up our studies on this matter.

Experiments

Studies were carried out using two different recipes. The first mixture (A), used mainly for the determination of y-emissions, consisted of 300g C, Cambosco; 900g KNO_3, Fisher Certified ACS grade; 80g S, Johnson Matthey, sulfur powdered, sublimed USP; 120g SiO_2, Fluka, Seesand, 40-200 mesh, acid purified; 100g $FeSO_4$, Fisher Certified; 30g Cd; lOOg Hg_2Cl_2, Merck, USP; 50g PbO, Fisher Certified lead monoxide; 5g Ag and 30g CaO. The second mixture (B) contained fewer chemicals and lesser amounts of each. Mixture B, used primarily for β-counting and neutron-activation analysis, consisted of 100g C, Johnson Matthey, carbon graphite powder, 300 mesh, 99%; 300g KNO_3, Fisher Certified ACS grade; 30g S powder, sublimed USP; 30g SiO_2, Fluka, Seesand, 40-200 mesh, acid purified; 40g FeS unknown origin, granular; 10g Hg_2Cl_2, Merck USP and 10g PbO, Fisher Certified lead monoxide.

For all bums, performed in a chemical fume hood, the vessel used was a large paint pail (leaktite paint pot #5). As also required by the recipe two 6 inch galvanized framing nails were placed in the reaction vessel.

A total of 16 burns were carried out. Burn procedure is described elsewhere (Noninski *et al.*, 1995a).

Neutron activation analysis of samples, before and after burning as well as each individual chemical component of the mixture, was performed in a 10 kW open-pool reactor at Worcester Polytechnic Institute, and a comparison was made of the y-spectra, which were obtained using a Germanium detector. The samples studied were irradiated for approximately 3 min. at 1 kW power.

Results and Discussion

The neutron activation analysis was specifically performed on burns #13 through #16 from mixture B and their y-spectra were compared to the spectra of the same samples before burning. An amount equal to 3.6166 g of mixture B before the 13th burning was placed in a small plastic vial. The small plastic vial was then placed in a larger one, transported into the reactor core and irradiated with neutrons for 3 minutes. Similarly, 2.8855 g of the 13th burned mixture B was irradiated. After irradiation of each sample a y-ray spectrum was recorded using a Ge detector shielded with Pb, Cd and Cu. A segment of these y-spectra is presented in Figure 1. It is seen from Figure 1 that peaks such as the ones corresponding to, e.g. $^{144}_{58}$Ce, at 133.55 keV or $^{203}_{80}$Hg at 279.19 keV initially present in the mixture B before burning are seen to disappear in the y-spectrum of the burned sample. Some of these disappearances can easily be explained by the fact that the high temperatures of the burn may be causing the evaporation of the respective elements. Upon careful scrutiny of the spectra one may notice appearance of small additional peaks after the bum (this part of the spectrum is not shown in Figure 1). These peaks, however, were established in the y-spectra of the nails and the vessel after carrying out neutron activation, and therefore, should be considered trivial.

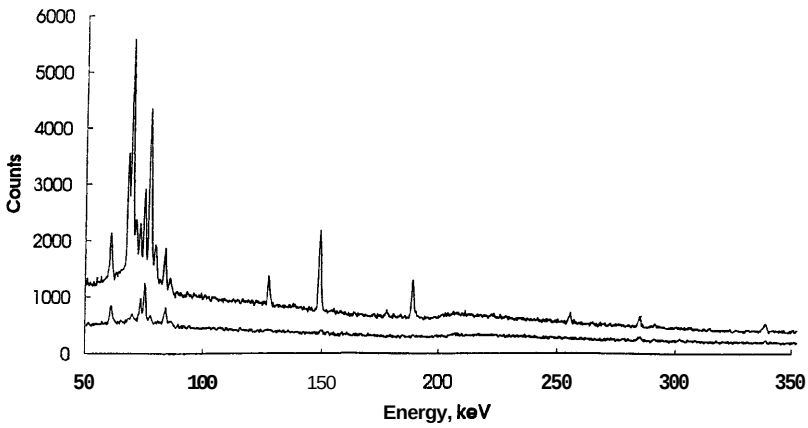

Fig. 1. Part of the y-spectrum of irradiated mixture B before burning (Burn #8). Upper trace — before burning; lower trace — after burning.

The peak which attracts the most attention is the one at 411.70 keV which may appear to be due to the presence of $^{198}_{79}Au$. The part of the y-spectrum containing this specific peak is presented in Figure 2. It is seen from Figure 2 that the peak which may ostensibly be due to $^{198}_{79}Au$ at 411.70 keV is present almost at the same level in the burned and unburned samples. Nevertheless, calculations show that the amount of what appears to be Au in the burned sample is 3.43×10^{-5} grams of the element per gram of sample. One may speculate that because of these stated differences in the amounts of the irradiated samples it may appear that the burned sample contains an unexpected large quantity of an element showing a y-peak at 411.70 keV. It should not be forgotten, however, that a peak at 411.70 keV was initially present in the mixture and might have been concentrated in the sample during the bum. Special efforts were applied to understand the nature of the peak at 411.70 keV. Several additional neutron-activation studies were carried out on the graphite samples used. At all times during these studies it was found that after irradiating the sample of Alfa graphite in the core of the reactor for three minutes at 1 kW power the peak at 411.70 keV was present. It turned out, however, that after leaving the sample for about an hour and recounting it this peak completely decayed. This shows that the peak in question cannot be due to $^{198}_{79}Au$ since its half-life is 2.7 days. Upon careful observation of the y-spectrum it was found that the peak at 411.7 keV is due to the second-escape peak of $^{52}_{23}V$ whose photopeak is at 1434 keV and whose half-life is 5 min. This explains the disappearance of the peak at 411.70 keV in about an hour. In all samples where there was the peak at 411.70 keV the photopeak of $^{52}_{23}V$ was also present (as well as the first-escape peak). In the samples where there was no photopeak at 1434 keV no peak at 411.70 keV was observed.

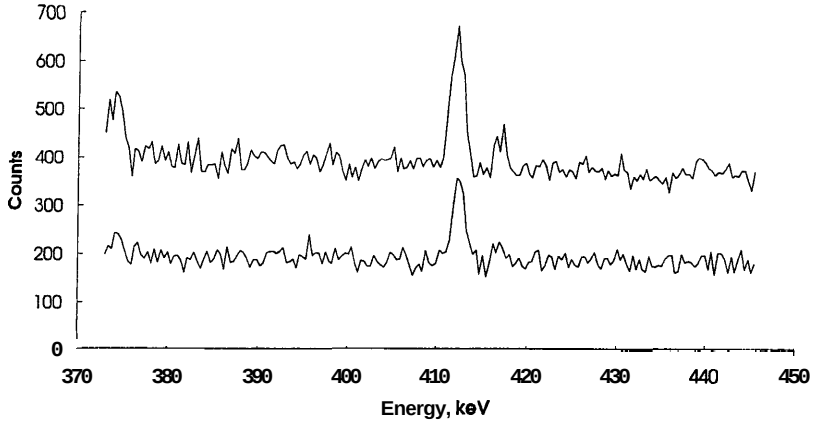

Fig. 2. Expanded region from y-spectrum containing the 411.70 peak (Burn #8). Upper trace — mixture B before burning; lower trace — mixture B after burning.

Conclusions

We did not observe non-trivial effects during our studies such as the appearance, as a result of a chemical process, of elements different from those initially present in the sample. One may wonder what may have caused us to carry out the above studies. These problems, one may argue, have been resolved long ago. However, it is obvious from the above results that there may be cases such as the ostensible increase of the γ (Noninski *et al.*, 1995a) and the decrease of the b counts (Noninski *et al.*, 1995b) due to burning, which may tempt some to abandon these previous conclusions. If left unresolved, these effects may lead some to unsubstantiated far-reaching conclusions. This may be as much detrimental to the scientific process as the deliberate ignoring of facts, which occasionally occurs. As we mentioned previously (Noninski *et al.*, 1995a), because the boundaries of what are considered to be absolute truths in science are not always clear cut, sometimes mere theoretical arguments, based on contemporary understanding, should not be the only guiding lights in scientific research. Although rare, it is not unusual in science to find experimental facts in clear contradiction with the accepted view of nature. Therefore, we remain critically open-mined and will be happy to be shown experimental evidence contrary to what we have found.

References

Lin, G. H., Bhardwaj, R., and Bockris, J. O'M. (1995). Observation of β radiation decay in low energy nuclear reaction. J. *Scientific Exploration,* 9, 2, 207.

Noninski, V. C., Ciottone, J. L., and White, P. J. (1995a). Experiments on possible y-ray emission caused by a chemical process. J. *Scientific Exploration,* 9, 2, 201.

Noninski, V. C., Ciottone, J. L., and White, P. J. (1995b). Experiments on claimed β-particle emission decay. J. *Scientific Exploration,* 9, 3, 317.