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The Radiation of Hydrogen Subatomic Particles in a Magnetic Field

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Abstract

Background: Low-temperature changes in the isotopic composition of elements (nuclear transmutation) may occur in technical and biological systems. Rossi's thermoelectric generators operating at temperatures of ~1000˚ C have shown themselves to be highly efficient. The phenomenon of nuclear transmutation has been experimentally established during the metabolism of microorganisms and during photosynthesis in plants. Experiments have shown that the isotopic composition of elements may change when hydrogen subatomic particles are involved in nuclear reactions.

Materials and Methods: We present our study results based on a model experimental system in a liquid medium involving hydrogen subatomic particles on the basis of electrolysis using nickel electrodes. In hydrogen subatomic particles, which are more compact systems than hydrogen atoms, the probabilistic centers where electrons and protons are localized intersect. In this connection, the dipole–dipole interaction of the magnetic moments of these particles leads to two possible states of the binding energy.

Results: Observation of characteristic recombination radiation, which occurs during the formation of hydrogen subatomic particles, in a magnetic field allows us to find patterns of the phenomenon. The magnetic field leads to an increase in the intensity of radiation and the broadening of the radiation lines. The reliability of experiments on radiation is confirmed by the observation of recombination radiation, which is released when pairs of hydrogen atoms combine into molecules and the observation of the peak associated with the recombination of hydrogen ions with the OH^- group and the formation of a water molecule.

Conclusion: The obtained results are relevant for the cold nuclear transmutation of elements. In particular, it is possible to increase the efficiency of thermoelectric generators with the help of a magnetic field and to control nuclear reactions in nickel-hydrogen reactors by changing the radiation intensity.

Keywords: hydrogen subatomic particles, magnetic moments, magnetic field, electrolysis, characteristic emission spectra

INTRODUCTION

In Rossi's thermoelectric generators, nuclear reactions take place when nickel interacts with hydrogen at temperatures of up to several hundred degrees [1]. In [2], it was shown that the phenomenon of transmutation can also be observed in nickel films obtained by electrolysis at room temperature. In this case, hydrogen participates in nuclear reactions in special, so-called subatomic states. Characteristic ultraviolet radiation should be observed when hydrogen subatomic particles form, as was shown in [2].

It was previously shown in [3] that the existence of the subatomic states of hydrogen was predicted based on the idea of Louis de Broglie about the relationship between the particle mass and the intrinsic frequency of quantum oscillations. In subatomic states, the proton is shielded in an electronic "fur coat", with smaller characteristic sizes, which contributes to the lower polarizability of subatomic particles. The angular distributions of probability density associated with the motion of the electron spin remain the same as in a free electron. This distribution is significantly different from the isotropic distribution of the probability density in the hydrogen atom in its ground state, which is the root cause of the high dielectric strength of the subatomic particles. Nevertheless, the ionization energy of the subatomic particles is only 4/9 of the ionization energy of the hydrogen atom, which corresponds to $\varepsilon_{is} = 6.02$ eV. Due to the intersection of the probabilistic electron and proton localization centers in hydrogen subatomic particles, a relatively strong dipole-dipole interaction of the electron and proton magnetic moments should be observed, which is in contrast to what is true of the traditional hydrogen atom. The value of the energy of this interaction and the contribution to the binding energy of the hydrogen subatomic particle can be estimated using the following formula:

$$\Delta\varepsilon \approx \pm \frac{\mu_1 \mu_2}{r_s^{\,3}} \quad (1)$$

where $\mu_1 = e\hbar / 2mc$ is the magnetic moment of the electron, $\mu_2 = e\hbar / 2Mc$ is the magnetic moment of the proton, and r_s is the characteristic size of the localized region of the hydrogen subatomic particle. We estimate it to be $\Delta\varepsilon \approx \pm 0.35\ 10^{-2}\ eV$. One of these values corresponds to the spin of the system *S=1,*whereas the other is *S=0.* The state will correspond to the basic value of the binding energy $\varepsilon_{is} = 6.02$ eV when the spins of the electron and proton are orthogonal. Due to this, on the basis of the spectral

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characteristics of recombination radiation perhaps the broadening of the peak radiation subatom hydrogen.

In our case, if we activate a weak constant magnetic field, then the spin splitting of the energy levels of the weakly bound electrons of the cathode may occur, which should lead to an increase in the density of states and the intensity of the radiation. In fact, the change in electron energy will be

$$\pm\frac{e\hbar H}{2mc}, \qquad (2)$$

where H is the magnetic field strength. When H=0.1 T, the change in energy is ~$10^{-5}eV$, which produces an almost continuous energy spectrum.

GOAL OF THE STUDY

We seek to confirm the effect of the magnetic field on the emission of hydrogen subatoms.. We also seek to demonstrate the possibility of increasing the intensity of radiation by removing the spin degeneracy of electrons.

MATERIALS AND METHODS

The experiments were carried out similarly to the procedure described in the first part of [2]. Electrodes made of 0.4-mm-thick nickel sheet with the characteristic dimensions of 4*6 cm^2 were positioned horizontally in a Petri dish. The center of the upper electrode had a number of holes that were 2 mm in diameter across a 4 cm^2 surface for the emission of radiation. It acted as an anode. The gap between the electrodes was fixed using fluoroplastic gaskets that are 2 mm thick. The emission of ultraviolet radiation through the liquid layer facilitated the formation of hydrogen bubbles, which collapsed in the anode holes. An end fiber sensor was positioned about 12 cm above the Petri dish. The whole system was placed in a black plastic box that was able to be sealed against any impinging light. An FSD-10 v6.1 spectrometer with a 200 µm fiber cable with a margin of error of ~4.5 nm per wavelength and a nominal sensitivity of 160 v/lx*s for a wavelength of 550 nm was used. The spectrometer was manufactured by OOO "Nauchno-tekhnicheskii tsentr volokonno-opticheskikh ustroistv" [Scientific and Technical Center for Optical Fiber Devices]. A movable plate was installed between the end fiber sensor and the Petri dish. This plate made it possible to shield against the radiation that was produced by the nickel electrodes during stationary electrolysis with a current density of ~20 mA/cm^2 and an electrode voltage of 3 V. The electrolyte was prepared from deionized water and high purity sulfuric acid assuming a concentration of 50 ml of water to 0.8 ml of acid. Sulfuric acid was ultimately chosen to increase the density of hydrogen ions at the cathode, thereby increasing the probability of the formation of hydrogen subatomic particles, including due to the fact that nickel sulfate is soluble in water.

Each spectrum was exposed for 60 seconds in order to accumulate a weak radiation signal. Optical spectra were continuously recorded as a series of five graphs in the wavelength range of 190 nm to 1080 nm, and then they were averaged over the amplitudes of the signals. To eliminate various noises, including the spectral features of the photodetector matrix, whose noise amplitude forms a peak and increases with time, difference spectra were considered: the spectrum of self-produced noises after the intersection of the Petri dish with the movable plate was subtracted from the spectrum with the electrode radiation. A total of seven series of measurements were taken, meaning that the graphs below represent the average of 35 spectra. A magnetic plate with a maximum intensity of 0.1 T was attached to a lever so that it could be brought down to the surface of the Petri dish.

STUDY RESULTS AND DISCUSSION

Figure 1 shows the averaged difference emission spectrum of nickel electrodes without a magnetic field. The vertical axis shows the length of emission lines in standard units. In the figure you can see several peaks. At the same time, the characteristic lines must also be observed. For example,

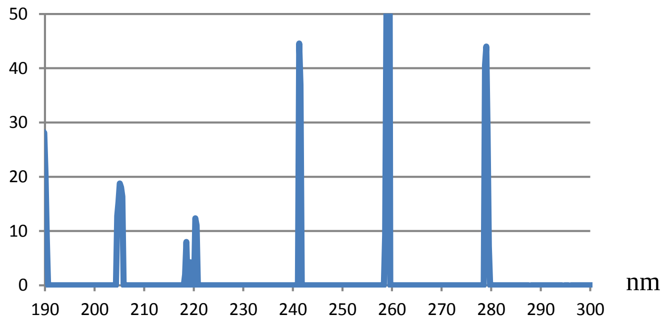

Fig. 1. The averaged difference emission spectrum from the nickel cathode area without a magnetic field.

At the wavelength of 240 nm, a peak that is associated with the recombination of hydrogen ions with the OH^- group and the formation of a water molecule should be observed. Since dilute sulfuric acid completely dissociates, the radiation at a wavelength of slightly greater than 240 nm, apparently, corresponds to the recombination energy of hydrogen ions through oxygen bonds in the acid molecule. Recombination radiation that is associated with the combination of a pair of hydrogen atoms into a molecule should be observed at a wavelength of 277 nm. Such a peak exists at a wavelength of 279 nm, which, given the margin error of the spectrometer, is a good match. In the area of 205 nm there is an expected peak associated with the emission of hydrogen subatoms. Many other emission peaks have been observed in studies of metabolism in biological systems [4,5]. In our case, negative values of signal amplitudes were observed, which indicates that the useful signal is small and is in a noise field. In Figure1, the negative values of the peaks have been removed, thereby excluding any possible small emission peaks.

Figure 2 shows the averaged difference emission spectrum of nickel electrodes with a magnetic field. The vertical axis shows the length of emission lines in standard units.

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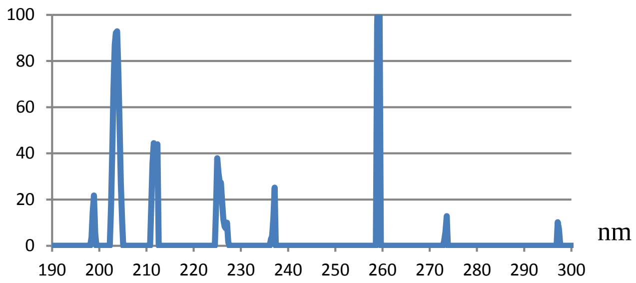

Fig. 2. The averaged difference emission spectrum from the area of the nickel cathode with a magnetic field.

In the wavelength range from 200 nm to 210 nm, the emission peaks of hydrogen subatomic particles in a magnetic field are markedly increased, which was expected from the model described in the introduction. There has been a certain shift in the spectrum. Other lines appeared that were barely visible without a magnetic field and which were strengthened, apparently, by the magnetic field. The emissions peaks in the area of 240 nm and 280 nm are attenuated. A very stable emissions peak was observed in the area of 260 nm, which, in essence, was the reference marker for a series of experiments.

At relatively high electrolysis current densities of ~100 mA/cm^2, noticeable heating of the electrolyte is possible, and the magnetic field of its own electrolysis current may also produce an effect. In particular, the nickel anode was replaced every ~5 hours of electrolysis. The widening of the emission lines, including the peaks of the hydrogen subatomic particles, can be seen in Figure3. The level of negative amplitudes that can be attributed to noises is noticeably reduced. There are other emissions peaks, such as, for example, resulting from yeast metabolism [4,5]. But in our case, electrolysis can be explained by the presence of recombination radiation from other elements in liquid media.

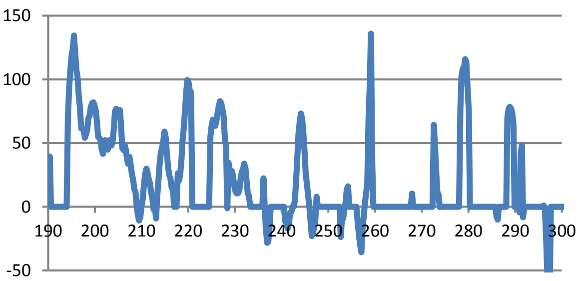

Fig. 3. The averaged difference emission spectrum from the area of the nickel cathode with a magnetic field during intensive electrolysis.

CONCLUSION

Thus, the application of a magnetic field increases the radiation level of hydrogen subatomic particles. By using a magnetic field, we are able to change the intensity of radiation and thereby control nuclear reactions in nickel-hydrogen reactors [6], increasing their efficiency and in particular preventing a meltdown.

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