High-Efficiency Electrolysis

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Introduction

Efficiency of water electrolysis, if being clearly defined, is an infinite value since pure water is dielectric and its permittivity is about 81. The conductivity current cannot be created in dielectric before electric pressure value is below electric discharge minimum level. In this case Work of water dissociation is produced by potential electric field that was disclosed in [1]. The potential field as power source in general but not only for water decomposition was discussed also in [2].

Formulation of the Problem

Since 1888, when Dmitry A. Latchinov patented his method for hydrogen production it is known that one of electrodes can be insulated from water. But hydrogen output for this case is very small. The problem is: in initial stage of the reaction water molecules directly interact with metal of electrodes but then all surface of the electrode becomes to be covered by thin gaseous layer. The layer is dielectric and it cannot transfer electrons from metal to water molecules. Owing to this reason dissociation process is stopped. When gaseous bubbles become quite great known Archimedes force become strong enough to pull off them from surface of electrode. The force is produced by weight of water. Understanding of this mechanism allows to find the way for high efficiency process.

Some experimental methods include increase of electrode surface (porous electrodes) to make the initial stage more continuous. Some special electrode metal can be also used that demonstrates the so-called «affinity» to hydrogen. By this way the gaseous insulation process is delayed if cathode can absorb protons. But in any case when all surface of electrode is insulated from water by gaseous layer the process will be stopped. There is one known solution to work in the initial stage of process only: it is pulsed electric field, which was experimentally tested by Igor Goryachev, Moscow [3].

The method to increase efficiency

Some technical solution is proposed to change conditions for creation of gaseous bubbles and to increase efficiency of pure water decomposition by permanent electric field, which is potential and does not require any power after it is created.

The solution is artificial increase of gravity force by means of rotation. Great Archimedes force in this case can be made and conditions for gaseous bubbles are changed. The centripetal force will make bubbles to move in center of rotation. The force value determines efficiency and it depends on design only.

Some input power is necessary to keep rotation and electric potential field but ratio between output power and input power could be very high.

$$K_{eff} = P_{out} / P_{in} >> 1 \qquad F.1$$

In this case there is some question about nature of extra power. In 1994-1998 the author published conception [4] about possibility of the transformation of gravity field energy into heat energy for high efficiency electrolysis processes. In this case some changes of time rate and gravity should be detected in local area of process. So, this technology is important both for energetic and aerospace industry. Also the local changes of space-time parameters can be used to clean radioactivity wastes that was described in 1960th by Ivan M. Filimonenko [5].

Conclusion

If gravitation field in area of process is considered as free power source, known law for energy conservation is valid.

$$E = E_g + E_{em} = const \qquad F.2$$

where E_g is gravity field energy, E_{em} is electromagnetic field energy. Physical sense of the formulation is: quantity change of electromagnetic energy in closed system is possible but only with corresponding change of other energy form in the same closed system.

Since network of potential field by closed cycle is equal to zero, F.2 for Work and Power can be presented as F.3

$$A = A_{em} + (-A_g) = 0 \qquad F.3$$

This formulation demonstrates the work of gravitation field and the work of potential field are in opposite sign. It is the sign of time direction so existence of space and mass need no power input since it is zero balanced process. When high efficiency electrolysis is created to extract heat power, second part of F.3 should be also changed.

References

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