

Patent holder: Dr. Walter Kothe presents an outstanding electrolytic water-cracking process

A revolutionary technical invention

Compiled by Dipl.-Ing. Gottfried Hilscher

Hydrogen is a clean fuel and ideal for future purposes. It is being said, that only water is dripping from the exhaust. But when hydrogen is burnt with the oxygen of the ambient air, the ambient nitrogen is then transformed into damaging nitrogen oxides. It's a different situation, when hydrogen (as $2H_2$) and pure oxygen (O_2) does produce electric current in a fuel cell.

However, hydrogen as energy source is most highly in demand. Of course, as raw material for the chemical industry and other branches. According to the statistic yearbook of the federal republic of Germany 2008, all hydrogen users have consumed a total amount of 1813 mio. m^3 of hydrogen. It is estimated, that from the before mentioned amount of hydrogen production, only 1 % is produced by electrolytic processes. More than 90 % of the hydrogen is produced by coal and hydrocarbon compounds. Electrolysis is expensive, production capacities are mostly minimal.

A breakthrough for the hydrogen production can be expected by a new german patent (DE 10 2006 007 773 B4 2010.02.11), which has been issued on February 11th, 2010. Its description: "Arrangement for water-cracking". Due to the patented process, there are numerous feasible production processes as well as product innovations with synergy effects.

Basic Technology

The patent holder, Dr. Walter Kothe, is speaking about a "basic technology", which he managed to push ahead. As co-inventor Mr. Harald Adam and Dr. Dieter Gruezmann are mentioned in the patent application. The main claim reads as follows: "arrangement for cracking water" with...

- a. one primary electrode and at least a second electrode.
- b. At least one porous ceramic ferroelectric layer, situated between the first and second electrode, selecting from crystals of ions, preferably barium titanate, strontium titanate, lead zirconat titanat, strontium bismut tantalate, bismut titanate, bismut lanthan titanate, bismut titanat niobat, as well as their mixtures. The pore size distribution is corresponding with the results of the mercury silver porosimetry in the range of 700 to 1500 nm (95 %); as well as
- c. an AC voltage source."

The inventor has been inspired by published but mostly disregarded knowledge of outsiders, including long term autodidactic studies. He had the chance, to exchange informations with some of the outsiders. The cell biology, very well known by the veterinarian, encouraged his hunger for additional knowledge further more. The knowledge akquisition was so meaningful to him, that he took time out from his veterinarian duties and worked for many years as a substitute of his veterenarian colleagues. It was no organized timing, that he got the German patent granted, just in time, as he switched over into public service as officially licensed veterinarian. The Japanese and the US patent is also hold by Dr. Kothe.

Water electrolysis years ahead?

In order to develop a better understanding of the "innovation level" of his invention, a short description of popular water electrolysis is given:

A water molecule (H_2O) consists of the monovalent hydrogen atom (H) and the divalent oxygen atom (O); ($H_2 + O > H_2O + \text{heat energy}$).

The energy, bound in one mol of water (18 g) represents 80 Wh = 0,08



Dr.med.vet. Walter Kothe

born November 29th, 1956

married, two children

study of veterinarian medicine

Until now practicing veterinarian

Since January 2010 in public service as licensed veterinarian.

Sideline interested in free energy, biological transmutation and cold fusion.

Intensive studies of the books of Victor Schauburger and Nikola Tesla.

Author of a couple of articles concerning "membranes" and "levitation according to Schauburger's principles".

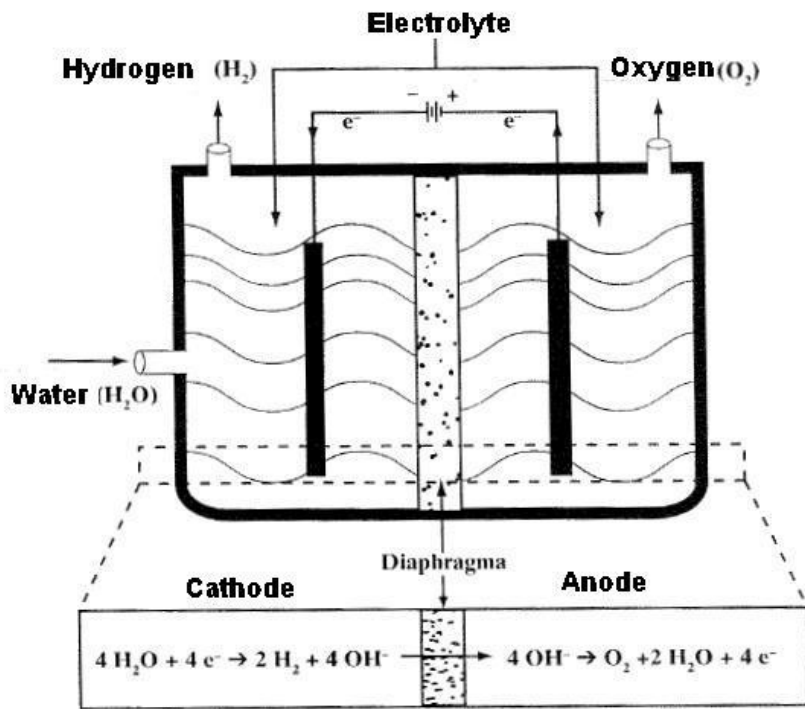
Even political polemic pamphlets are no taboo subject.

Since 2003 development of a new water-cracking-process together with Harald Adam.

This project is meanwhile payed and patented by federal funds.

kWh. When water shall be dissociated into hydrogen and oxygen, this amount of energy at least is required. In order to dissociate 1 kg water electrolytically, at least 0,08 kWh * (1000 g * 18 g) = 4,44 kWh are required. Additionally it must be prepared by an electrolyt. This function is carried out by salts, bases and acids in aqueous solution or as pastes. The electrodes, mounted in so called electrolyzers, are on one hand good electric conductors, on the other hand chemically inert.

The "diaphragme", a membrane, separates during the electrolysis the produced gases. The electrodes, mounted close to the membrane, as well as the membrane itself is very thin, in order, to keep the electric resistance small. Instead of the minimum required 1.23 Volt for water-cracking,



Basic principle of water electrolysis

usually 1.7 till 2.3 Volt are applied. The positiv charged ions are discharged at the cathode.

They are coupling with the existing electrons, whereby hydrogen molecules are produced. It is not necessary, to mention the different processes of water-electrolysis. The consumption of energy per m³ hydrogen is in the range of 2.6 kWh till 4 kWh, using the "autothermic" version.

We should mention once again in this connection, that today more that 90 % of the demanded hydrogen is being produced by hydrocarbon and coal. Nevertheless: the largest hydrogen source on earth ist water. In the outer space, hydrogen is the most frequent element. But on our planet it occurs only in combined form. Due to the patent specification, the large-scale production of hydrogen via electrolysis is consuming very much energy. This has to do with the so called overvoltage penomenon, why it is used for small quantities only. The invention of Dr. Kothe is claiming "to sustain an electro-chemical arrangement, which produces hydrogen from water in a cost effective way and in sufficient quantities".

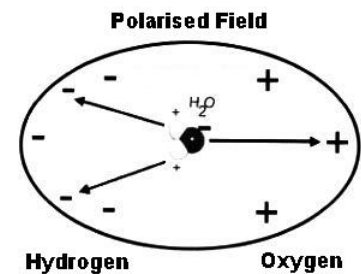
With classic methods only 20% of efficiency is being reached, Dr. Kothe's goal is an efficiency of more than 90 %.

Nano porous ferro-electric membranes

The basics, to reach this goal, have been the studies of Dr. Kothe for years. Small experiments have been followed by the development of ceramic nano-porous membranes for large-scale application, instead of usual diaphragmes. In 2005 he titled his memorandum "ferro-electric membranes in 'hyper polarizers'". The content of this memorandum has been copied into the patent as the description of function and construction, in order to make the "revolutionary" design for the water-cracking system more transparent. Ferro-electric parts play a leading role, they are characterized by an extraordinary high dielectric constant.

They are remanent polarized by electricity – in analogy to the term "magnet" – they are called "electrets". Some electrets do conserve their electric voltage over decades on a relatively constant level.

Dr. Walter Kothe turned his back on what is called an electrolytic water-cracking process in an "electrolyzer". The construction principles and the chemical processes are pointed out in the illustration under the heading "Water electrolysis years ahead?".



Dissociation of the water molecule into hydrogen und oxygen under the influence of an electric field. The picture illustrates the condition in a pore of a nano-porous membrane.

(Taken from the book „Wasserstoff – Energietraeger der Zukunft“ by Stratis Karamanolis). The generation of hydrogen in Kothe's „hyper polarizer“ (in stead of an electrolyzer), is completely different.

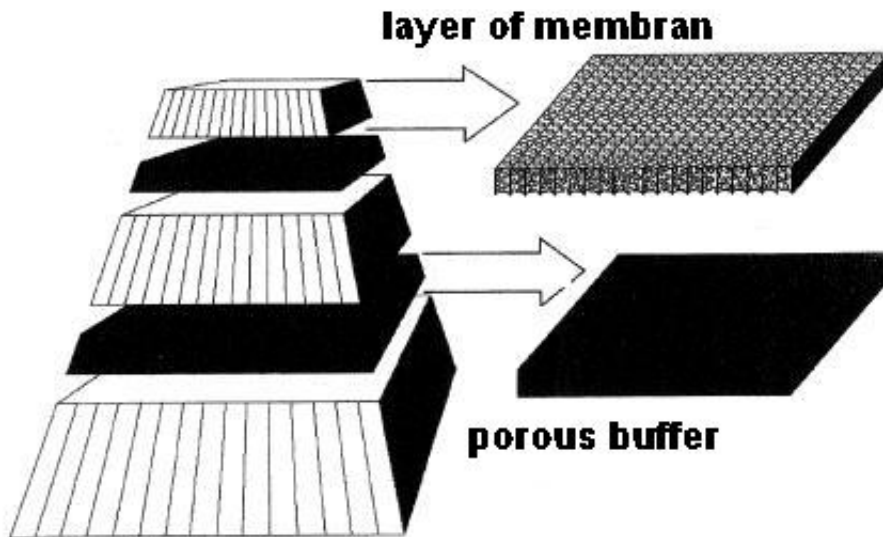
According to the formula $2\text{H}_2\text{O} > \text{O}_2 + 2\text{H}_2$. The dissociation of the water molecule (a dipole), happens under "preload", which is permanently conserved in a nano-porous ceramic body. We are speaking of "Lorentz Fields" with an imprinted electro-magnetic pulse. The water-cracking process does happen, not by a current flow, but by field and resonance effects. Instead of ions, evaporations of hydrogen and oxygen gases are produced, which are dissolved in opposite direction from the pores of the membrane. The electric fields, oriented in parallel, disable the thermal agitation of the water – which is, indeed, very welcome.

Water-cracking by high voltage resonance

Each single nano-porous membrane (mono layer) is permanently charged or, in other terms, permanently polarized. In a hyper polarisator they are piled up in several layers, but not in similar mono layers, but in layers with materials of different properties. Dr. Kothe summarizes those as "graded-index materials", which lead to a grading of effective parameters. This are:

- the dielectric constant
- the porosity
- the membrane dimension
- the Lorentz Field

All in all: the appropriate geometry of the reactor governs the function



General construction of a pile of membranes in a "hyper polarizer" according to Dr. Kothe .

and supports it dynamically. Also a compact construction can be realized. The nano-porosity, as Dr. Kothe points out, builds up a huge internal reaction surface, which acts like a catalyst. The hyper polarization is characterized further more by high electric voltage and low electrical conductivity. Both together, the field and the resonance principle, make the inventor speak of "water dissociation by high voltage resonance". The grading of the material allows the utilisation of electrical dispersion effects, which lead to a self-control of a pile of membranes. By these means, the single mono layers as well as the complete piles of membranes are steered by their own resonances. By wobbling the functional process in a pile it can be steered into a preferred direction. This phenomenon can cause a pulsing effect in the media flow from membrane layer to membrane layer. By those means the reaction partners of the medium can be activated, to react with each other in the desired sequence.

Dr. Walther Kothe points out further advantages of his concept: because it is possible, to crack distilled water (aqua dest.), feed pumps are dispensable, on behalf of the reduced viscosity. Ceramic reaction bodies are causing really no corrosion.

Externally mounted electrodes are less susceptible to corrosion as those in electrolyzers, which must be exchanged quarterly. Due to the elec-

tronic circuit the apparatus can be steered nearly without reactive power in the excitation system; on this behalf the membranes have to be permanently polarized. Due to Dr. Kothe's scientific knowledge, there is no further optimizing potential in classical water electrolysis. The expected efficiency of 90 % by hyper polarization is to be realized in case-sized boxes, which can easily be transported. The reason is to be seen in the really huge reaction surface of the membranes.

Environmentally friendly and economically viable

Important preconditions are the "unique characteristics" of Dr. Walter Kothe's invention, collected in his patent specification. The introductory chapter says:

"The production and utilization of graduated ceramic membranes in reactors for production of hydrogen from water will presumably lead to a key technology. This allows with high probability the development of chemical reactors for possible areas of use for instance in complex chemistry till to the construction of power sources for engines and generators on water basis.

The outstanding new membrane technology allows to produce hydrogen environmental friendly and economically viable, this could incorporate the solution of urgent ecologic and economic problems."

"The hydrogen reaction of a H_2/O_2 mixture can substitute partially other fuels for ground vehicles, air and space crafts and so compete with other fuels seriously. Hydrogen is for instance, separatable by additional membranes, in a passive way (just as zeolites). Other technologies, nearly already mature, such as fuel cell or hydrogen engine, have by now only little chances, to be introduced into the market in a wide scale. Until now, the production of hydrogen is too expensive. This shall be changed with the present invention."

"A really new reactor type on ceramic basis, which improves the efficiency of hydrogen production significantly, can help, to overcome the afore mentioned discrepancy." It is very likely, that ecological essential technologies do overcome the economic obstacles faster, if implemented in large scale. Furthermore, there is already a rising demand for hydrogen as chemical element in larger quantities."

"The present invention constitutes a concept for the new reactor type. The experiments till now show promising results. The reactor is, according to preliminary tests, not only feasible for the electro-chemical water-cracking process, but can be modified for chemical and physical goals, whereby a real basic and key technology is coming forward."

"Main subject of the invention are the membranes in any shape and form of dimension"

The specifications of the patent says, "that membranes and piles of membranes in any shape and form of dimension, which are as well ferroelectric as also porous, can be fitted into the patented configuration. Properties of the membranes and/or piles of membranes of organic and/or anorganic materials: they are as well ferro-electric as porous and have the characteristic gradation of dielectric constant of membrane systems for the proper utilization of electric dispersion effects. The gradation of porosity (the quantity and the diameter of the pores) cause an increasing fine distribution and the generation of

the widest possible internal reaction surface.”

That what the patent specification points out in detail and in sober language, is the result of yearlong extremely important studies of Dr. Kothe, such as brainstorming with “knowing outsiders”, target-oriented experiments as well as practice-oriented development work in research facilities, which are predestined therefore.

During the interview with the author, Dr. Kothe, of course, cannot hide his pleasure at the “solid interim results”. Now the inventor is encouraged, to cooperate with the industry for financial exploitation of the patent, in order, to get the required market introduction. His vision has already numerous applications in the focus, which exceed by far the water-cracking process. He knows very well, that he has realized a basic invention, as the patent office certified already.

His porous ferro-electric polarised ceramic membranes, says the inventor, may lead one day to an application, which you could never imagine today. Dr. Kothe dreams of a “soft chemistry”, where the reacting agents are not supported by high pressure or high temperature, in order to form new substances. Via resonances the reaction partners shall be confronted with the necessary energy, which is needed by the process. In case it would be possible, to let the reaction happen in multiple steps in different single layers with certain eigenfrequencies, then it would be feasible to control those layers step by step.

Dr. Kothe is very grateful for the resonance principle, discovered by Dr. Dietrich Schuster.

The NET-Journal has reported on Dr. Schuster several times. After his death in January 6th 2009, his scientific merit has been honoured in an obituary and additionally by a reprint of his last lecture (march/april issue 2009) – besides others -.

The ahead thinking Dr. Kothe does imagine, that his outstanding new membrane may press ahead the development of “cold fusion”.

– To this subject you find a status report (in German) on page 37 of this issue.

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(German text translated in English
by Helmut Menne) may 2010)

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Helmut Menne, 02.05.2010

Event - 18th World Hydrogen Energy Conference

Date(s) 16 May 2010 - 21 May 2010, Location: Essen/Germany

Dr. Walter Kothe has subscribed for a poster session on the 18th World Hydrogen Energy Conference in Essen, organized by the Ministerium für Verkehr, Energie und Landesplanung NRW.

This conference promotes hydrogen technologies and publish scientific and strategic issues in the field of hydrogen and fuel cells giving answers based on the most advanced state of the art in science and engineering. Decision makers in politics, industry, research, and finance will be addressed in dedicated strategic sessions of the first conference day. Contributions from international experts will focus on the role and path of hydrogen in the energy economy.

The major share of the programme is dedicated to the presentation of cutting-edge research and development on hydrogen and fuel cell technologies. A broad range of topics will be covered, including basic research, systems development and hydrogen technology deployment and also political implications. The respective sessions will feature an introductory review lecture providing expert information on the state of the art. New materials and design concepts, modelling and physico-chemical processes are focal points in the conference programme. Recent progress will be presented for fuel cell applications in transport and stationary power generation as well as existing and emerging markets for fuel cells and for hydrogen safety research.

New findings of strategic and socioeconomic analyses will be covered. At a training and information event on hydrogen and fuel cells students from schools and universities and teachers will be provided with first-hand information. Advanced technologies, qualifications, career choices, and educational opportunities will be presented. The IPHE Global School Student Competition will be the highlight of this part of the conference programme.

The WHEC 2010 programme will be complemented by an international exhibition of advanced hydrogen and fuel cell technologies including Ride & Drive events. The exhibition will be open to the public on one day of the conference. On the last conference day, technical tours will be offered providing insights into the hydrogen and fuel cell facilities in North Rhine-Westphalia and Germany as well. The conference will also address the broad public with a comprehensive accompanying programme to display this new and prosperous technology in conjunction with the activities of the European Capital 2010.

The official language of the conference is English.

Source: www.whec2010.com

