How ions are produced by the Ion Cell Cleanse device.

Source: **Bassam Z. Shakhashiri** (1992) *Chemical Demonstrations: A Handbook for Teachers of Chemistry,*Vol.4. p156.

Description: Water is decomposed into hydrogen and oxygen gases using electricity. A Hoffman electrolysis apparatus collects the two gases separately and shows the 2 to 1 ratio nicely. If a pH indicator is used the anode becomes yellow and cathode becomes blue.

Concept: When a DC current is passed though a water solution, water is oxidized at the anode producing O_2 and reduced at the cathode producing H_2. The solution becomes acidic at the anode and basic at the cathode.
At the anode: $2\ H_2O\ (l) = O_2\ (g) + 4\ H+\ (aq) + 4\ e-$ (indicator blue) Acidic pH.
At the cathode: $4\ H_2O\ (l) + 4\ e- = 2\ H_2\ (g) + 4\ OH-\ (aq)$ (indicator yellow) alkaline pH
Diagram:

The ION CELL CLEANSE array uses 2 sets of plates with different surface areas to generate different quantities of ions in the foot bath water.   One method of measuring the quantity of positive or negative ions in the water is the pH reading.

Here are 2 drawings from our patent application showing the energy flow through the plates in the array.

In figure 3 we see that one set of plates has (4) panels and the other set has (3) panels.

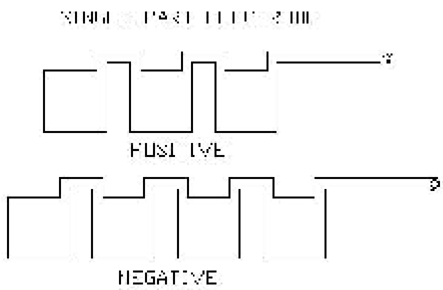


FIG 3

In the negative mode there are 3 cathodes and 4 anodes.

In figure 6 the plates are shown connected in the positive mode.

When the **<u>Ion Cell Cleanse</u>** is in positive mode there are 4 cathodes and 3 anodes.

When the **Ion Cell Cleanse** is in the negative mode there are 3 cathodes and 4 anodes.

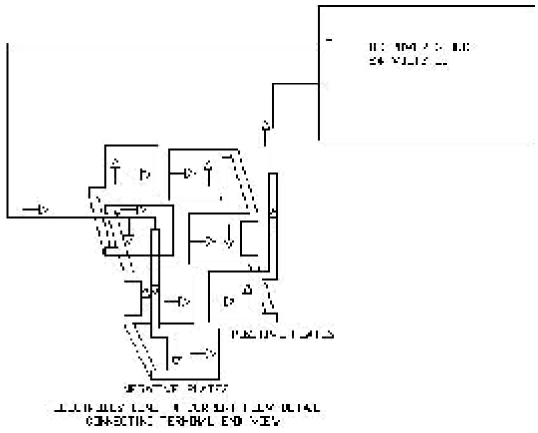
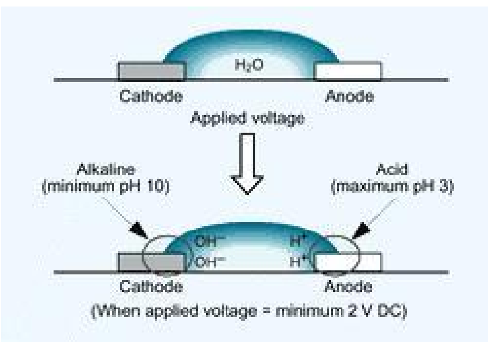
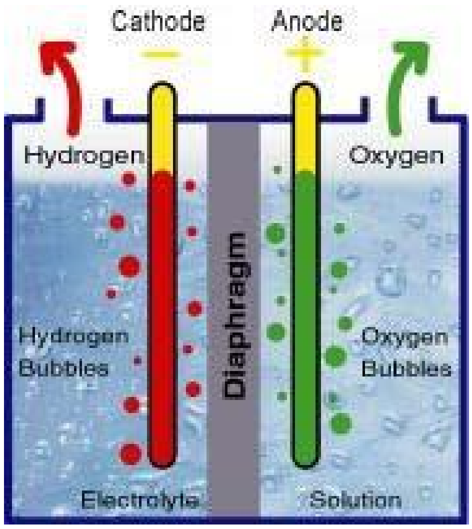


FIG. 6

The plates produce a pH change in the water as current is applied to them. Hydrogen and oxygen bubbles are created as the water is broken down in to gases through the process electrolysis.





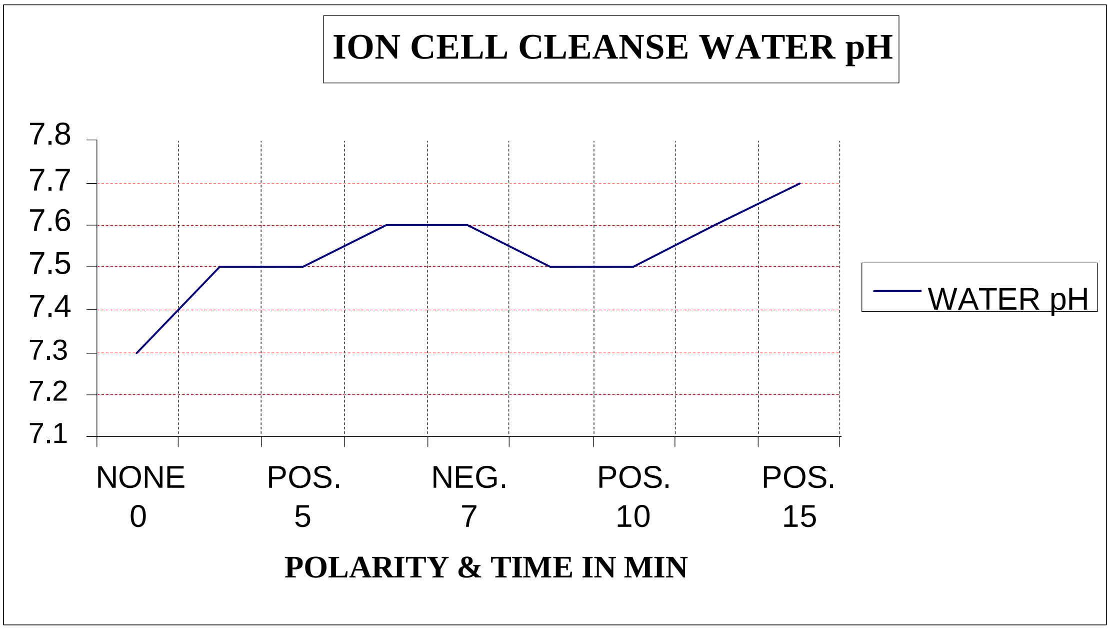
Here are the results of a pH tests on the water treated with the **Ion Cell Cleanse** array showing the changing levels of ions in the water.

Ion Cell Cleanse water pH test 7/6/2002. Test time 15 min in 70% Pos. 30% Neg. mode. PH test meter was **Technika** 840037. Plain tap water with no salt added was used to do the testing. The array was removed from the water to take the pH readings. When the array is operating, the electric current causes the pH meter to off scale acid by the anode and alkaline when near the cathode. This data was taken over the period of 15 min to show the changes in pH caused by the changes in size of the cathodes and anodes. Pos. mode (4 cathodes 3 anodes) (NEG. Mode 4 anodes and 3 cathodes)

Time min.	Polarity	WATER pH
0	POS.	7.3
3	POS.	7.5
5	POS.	7.5
7	POS.	7.6
7	NEG.	7.6
10	NEG.	7.5
10	POS.	7.5
12.5	POS.	7.6
15	POS.	7.7

The quantity of ions produced changed the pH to alkaline when the **Ion Cell Cleanse** was in the positive mode.
The quantity of ions produced changed the pH to toward acid when the **Ion Cell Cleanse** was in the negative mode.
The overall change in the water is alkaline indicating an increase in the quantity of antioxidant OH- ions in the water. Micro-water machines also produce alkaline OH- water. The health benefits of the OH- water have been well established in many studies in Japan and other countries.

As the polarity was changed, the surface area of the anodes and cathodes changed and so did the pH readings taken in the water.



Here is one theory as to how the **Ion Cell Cleanse** process produces a more alkaline state in the body.

Through the process of osmosis and diffusion OH- ions are transported through the skin membrane due to ion charges. This process could produce a more alkaline state in body chemistry.

Acids could be transported toward the OH- ions through osmosis and diffusion into the foot bath water. This process may be one factor in the color reactions noted in the water as the acids react with the OH- ions.

Source: Fluid concepts Hyper-Physics Thermodynamics *R. Nave*

Diffusion

Diffusion refers to the process by which molecules intermingle as a result of their kinetic energy of random motion. Consider two containers of gas A and B separated by a partition. The molecules of both gases are in constant motion and make numerous collisions with the partition. The tendency toward diffusion is very strong even at room temperature because of the high molecular velocities associated with the thermal energy of the particles.

Rate of diffusion Osmosis Thermal energy

$$\text{diffusion rate} = K\sqrt{\frac{T}{m}}$$

Rate of Diffusion

Since the average kinetic energy of different types of molecules (different masses) which are at thermal equilibrium is the same, then their average velocities are different. Their average diffusion rate is expected to depend upon that average velocity, which gives a relative diffusion rate

Where the constant K depends upon several geometric factors, including the area across which the diffusion is occurring. The relative diffusion rate for two different molecular species is then given by

$$\frac{\text{diffusion rate of A}}{\text{diffusion rate of B}} = \sqrt{\frac{m_B}{m_A}}$$

Osmosis

If two solutions of different concentration are separated by a semi-permeable membrane which is permeable to the smaller solvent molecules but not to the larger solute molecules, then the solvent will tend to diffuse across the membrane from the less concentrated to the more concentrated solution. This process is called osmosis.

Osmosis is of great importance in biological processes where the solvent is water. The transport of water and other molecules across biological membranes is essential to many processes in living organisms.