

Facts related to the Chemistry of Physics associated with Electro-photo chemistry and the production of Quantum Nano Silver.

By Hans Laroo ©

Abstract:

Water IS the great dissolver, nothing can compare to it. Also without water, there is no life of either flora or fauna. This same life however is to a large extent responsible for the contamination of water by way of the chemistry it produces, such a hydrocarbons (methane, ammonia to name but a few). Then there are all the other carbon related compounds, in particular carbon dioxide and carbonates, all changing the pH value of the water either to a severe alkalinity or acidic quality at either extreme. Only metals that display hydrophobicity (water hating) are able to place an interfacial electric charge between itself and the water (Zeta potential) in order to preserve themselves from being dissolved. Silver is one of these metals. It is hydrophobic and unless water with its Oxygen atoms is able to oxidise the silver and turn it into a cation to be dissolved, the silver will remain as a metallic silver indefinitely.

Water is also the great pretender, posing as an enormously high resistance and opposing any electric current in one instance and as an almost total conductor the next. This swing from one extreme to the other, spans from hundreds and even thousands of millions of Ohms at one end to just one Ohm at the other. But even so, its resistance, whatever that resistance is to opposing current flow can change drastically when the potential of the applied voltage potential is changed.

This paper will present some interesting facts about water that will change our views when we attempt to produce so-called colloidal silver in an electro-photochemical production procedure.

Keywords: Ohms Law, Meg (a) Ohms, Pico and Nano ampere and hydrated electrons.

Introduction:

Ohms Law relates to Current (I), Resistance (R) and Voltage (potential) either (V) or (E). Know two of these values and you can work out the third. Water behaves in different ways with different materials and actually structuring its molecular formation to adapt itself to whatever is in the water or in what itself is confined in. Recently a new discovery was made that water can also adapt itself by 'spreading and stretching' to get into very small spaces or inclusions that are normally too small for water to get into. This unusual form of quantum confined water was discovered inside a Beryl crystal, perhaps an emerald (green), an aquamarine (colour of water) or a chrysoberyl such as an alexandrite (changes colour with temperature from purple to red and to a pale green). The information did not say what type of beryl it was. It is understood that this quantum confined water may be inside living tissues as well. If it can also exist inside atomic silver clusters it could possibly create unexpected outcomes.

When starting out in colloidal silver research, it was realised that the common strategy of the day was using low voltages and moderately high current, i.e. up to 24 volt DC at 100mA or more for the process of electrochemical colloidal silver production. It really did not work for two reasons:

1. The electrochemical procedure was more akin to electrolysis with the added use of salts to make the current go faster as for hours no current was flowing at all without it. We have to ask ourselves the question, if we, in an effort to increase the current between the two electrodes and add some ionic material in the water to promote this, are we increasing the silver extraction or simply increasing the current of the added ionic matter. I personally do not believe that such ionic seeding helps in any way producing more silver. The reason for that is that the current between the electrodes comes from the electronic constant current generator. Instead contamination of the water is increased by the introduced ionic species.

2. The entire electrochemical production appears totally uncontrolled in all aspects and in addition ignoring the fact that both ambient light and temperature ensured that only ionic silver was produced with perhaps a smidgen of colloids thrown in.

Realising these inadequacies, a complete departure from these flawed practices was implemented, i.e. higher voltage and low controlled current and the use of singular wavelength of light and under refrigerated conditions to also control the temperature. Experimentation at the time indicated that in order to allow some level of current to flow, the voltage potential had to be sufficiently high in order to break-up the water molecules into its constituent components. Simultaneously, to ensure a slow process of extracting silver atoms from the anode and ensure that the thus formed silver cations would be delayed travelling to the cathode and turned neutral by a sufficient level of irradiation of 420nm violet light. This last information I was privy to from my days as a photographer, knowing that silver halides on Black and White film can only be exposed and form latent images by means of violet light. The second cue came from an astronomer, complaining the poor viewing of blue stars with his silver coated parabolic mirror of his telescope. He obviously did not realise that silver absorbs violet light.

3. Measuring current flow as it should be, is not in fashion. Instead artefacts called Inductivity and conductance are used to measure current flow of predominantly ionic matter dissolved in water. Incidentally, ionic silver is totally dissolved and cannot be seen and only measured, but not on its own but as part of all the ions in the water. To somehow make these artefacts legitimate a reciprocal of Resistivity was introduced, a term really suitable for current flow in solid metal conductors such as brass, copper and silver. In theory it is accepted by many, but in reality it is not technically and scientifically correct. Neither are the measurements linear, most likely due to the fact that voltage potential is not part of the equation and has been deliberately left out as if irrelevant.

4. Initial experimentation proved that at a voltage potential of 300 volts DC, a controlled and limited current can flow at a level of 500 micro Ampere/hour. Years later it was realised that a doubling of the voltage would bring about a controlled and limited current three times higher at 1.500 micro Ampere/h. This proves that elevating a voltage, allows an increase in current flow (not conductivity). Very recently when designing a colloidal silver generator expected to produce colloidal silver using a low voltage of 32 volts DC could not manage anymore current than 2,5mA after a period of twelve hours. Initial current was only in the very low micro ampere range. Doubling the voltage to 64.4 volts DC managed to start just below 1 mA and to rising to 6.5mA after 8 hours. A further test conducted on 4 samples of water, (a) bacteria free water for Gas Chromatography, (b) deionised water and (c) distilled water from ACR and the last sample (d) from a local supplier of distilled water, using three forms of current/conductivity tests and three light obscurity tests with red, green and violet laser pointers proved conclusively that (d) the local

distilled water performed the poorest, having the highest conductivity. All the current measuring tests were conducted with a specially constructed acrylic probe fitted with a pair of very pure silver foils measuring 10x10 mm (1 cm²) and 10mm apart as the accepted standard for amperage/cm. One of the instruments used, boasts a specification of input resistance at 10,000 million Ohm and a voltage on the probe of less than 1 volt DC to ensure so as not to load the water and secondly not breakup the water molecules and cause unwanted polarisation.

Distilled water is generally recommended for use in colloidal silver production. In particular, steam distilled water created copious amounts of free carbon dioxide in both the boiler but also in the condense lines. Water from wells may contain 100s of ppm in carbon dioxide. Also carbon dioxide will ionize in water, and produce corrosive carbonic acid as below:

H₂O (water) + CO₂ (carbon dioxide) will form H₂CO₃, which is carbonic acid. Reference page 366, section 53, Handbook of Industrial Water Conditioning by Betz Eight Edition 1980.

5. The presently accepted measure of Siemens and its fractions such as the micro Siemens/cm as well as the term Resistivity /cm were both construed and introduced for measuring the parameters of current and resistance factors of solid conductors, generally metals. To be also using these concepts for measuring the character of water is certainly flawed by virtue, that with increasing contamination the path of current through the water will not 'be linea recta', in a straight line. That the present conductivity measurement is flawed is evidenced by a number of things. One is the linear division of conductivity and then within each division it is shown as a logarithm. How can that be?? Ultra-pure water by definition should have an equally infinite resistance, however that depends both on temperature and the volume of the water. You may introduce a standard of measurement that is based on distance, i.e. 1 cm, just like resistivity for solid metals, but doing the measurement in a 1 litre tank makes a substantial difference from using a 40 litre tank as the following experiment shows:

Two silver probes were placed apart 1,000 mm in a 1200mm tank of 40 litres of deionised water. It happen to measure exactly 1,000 million Ohm at that distance. Subsequently bringing the electrodes closer together from 1,000mm to 800mm and finally to 400mm saw a gradual reduction in resistance to 300 million Ohm. When using the 1cm apart silver probe it also measured that same amount of 300 million Ohm. This creates a problem with one side of chemistry science claiming a maximum resistance of some 18.18 million Ohm, another group claiming 25 million Ohm and another group yet again presenting a maximum of 100 million Ohm. Who is right? So far I have been unable to determine how any of the others have come up with their figures and what instruments they use to determine the actual resistances. I personally use 1% precision resistors from 0.1 Ohm to 10,000 million Ohm to verify what I am measuring. Any of the readings were also made with a variety of digital multimeters but they even differed amongst each other. So much for digital instrumentation, I prefer analogue for precise measurements any day.

6. What else is found in water?

The problem with water being such an efficient dissolver, statements like "finding just about everything in there but the kitchen sink" with a goof chance that nowadays there may just be on or two in there anyway. Plastic bags, pharmaceuticals, hormones in excess and the organic remains of the dead. I read once in a publication that it would not be unusual for water to contain at least 40,000 different chemicals and whilst many strategies are available to remove much of that by filtering, deionising and distilling, a great deal may still be in there but not economically

viable to remove. It is disturbing to notice however that too much emphasis is placed on just measuring the ionic content without considering the non-ionic content as well. For that reason it would be prudent to consider a return of optical based instrumentation and accurately assess “what else is in the water?” Such optical equipment was readily available in the 20th Century and could be re-introduced albeit with up-to-date technologies and provide for ‘informed decisions to be made’, if the water available is FIT ENOUGH for its intended use.

7 The fallacies of light scattering.

Many test their questionable colloidal silver products, using a red or green laser by evaluating their product with light scattering, unaware that any rubbish in the water is more likely to scatter than the ionic silver or small amounts of neutral silver in the mix. Water ought to be tested and accurately evaluated with photo-diode sensing equipment and noting down the value against the final product for comparison. Doing anything else is wishful thinking and meaningless.

CONCLUSION

It is quite obvious and scientifically evident that water and water containing nano sized silver in an electrical suspension warrant more astute research than what is done at present. There are too many anomalies with the production of water and colloidal silver and the measurement of their properties that presently make little sense. However finding some scientists and researchers treating this science as some religious belief system and using ‘Buzzwords’ instead of proper identification of the subject under their research, is a worrying trend.

Hans Laroo