

# Is There a Credible Basis for Magnetic Devices to Represent Green Technology?

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Over the years, numerous articles have been published on magnetic devices and their negative performance aspects. Articles have appeared in publications such as the *Wall Street Journal*, *AARP Newsletter*, *Popular Mechanics* and the like. In most cases, the reporter likely contacts a professor at a local university, who relates that there is no foundation in science for these devices to work; hence such negative articles are bound to arise. Few professors even check their scientific guide, the *CRC Handbook of Chemistry and Physics*. Located within is the "Magnetic Rotary Power Index," which relates the degree of effect that a magnetic field has on a specific hydrocarbon molecule. Also, many professors are not even aware if there are colleges or universities (even their own) engaging in this research.

As a result, names and organizations are never mentioned nor their positive research papers on the positive effects of magnetic treatment reported in the press or on television. A Google search will relate favorable research in magnetics being done by (this is a partial list, of course): Prof. Rongjia Tao, Temple University; Prof. Raymond Cho, Drexel University; Prof. Samuel Sami, University of Moncton; Prof. Ken Busch, Baylor University; Prof. Klaus Kronenberg, California Polytechnical-Pomona; Prof. Arthur Kney, Lafayette College; Prof. Simon Parsons and Prof. Simon Judd, Cranfield University (United Kingdom); Prof. Michael Coey, Trinity College (Dublin, Ireland). Needless to say, there are a number of journal articles, research papers, doctoral theses, patents and the like that are never presented to the public.

Magnetic or electrostatic fields can be utilized to reduce mineral scale from boilers, furnaces, water heaters and heat exchangers and significantly reduce energy cost. As cited by the U.S. Bureau of Mines, a .25 inch layer of mineral scale can reduce heat transfer by 25%, thus increasing energy costs.

Also, it should be noted that the use of ion exchange softeners that discharge brine into the aquifers should not be considered green technology. Magnetics offer a far more environmentally acceptable means for the elimination of hard water deposits.

Magnetics can also be used to improve the efficiencies of air conditioners, refrigerators and heat pumps. U.S. Patent 6662569 represents such a means. In a series of articles published by the *International Journal of Energy Research*, Prof. Samuel Sami (ASME and ASHRAE Fellow) reports that a magnetic field will allow a refrigerant to boil with lower expenditure of energy since a magnetic field is used to disrupt intramolecular forces, and in U.S. Patent 7340919 an electrostatic technique uses the electronic dissimilarity between halocarbon refrigerants and silicon materials such as glass. The triboelectric effect is similar to the magnetic technique with respect to the disruption of forces; however, the mag-

netic techniques favor refrigerants of high dipole moments and the triboelectric will work on the older non-polar refrigerants.

The magnetic device is a clamp-on device, while the triboelectric device requires an insert to be placed into the liquid phase of the refrigerant line prior to the point of evaporation.

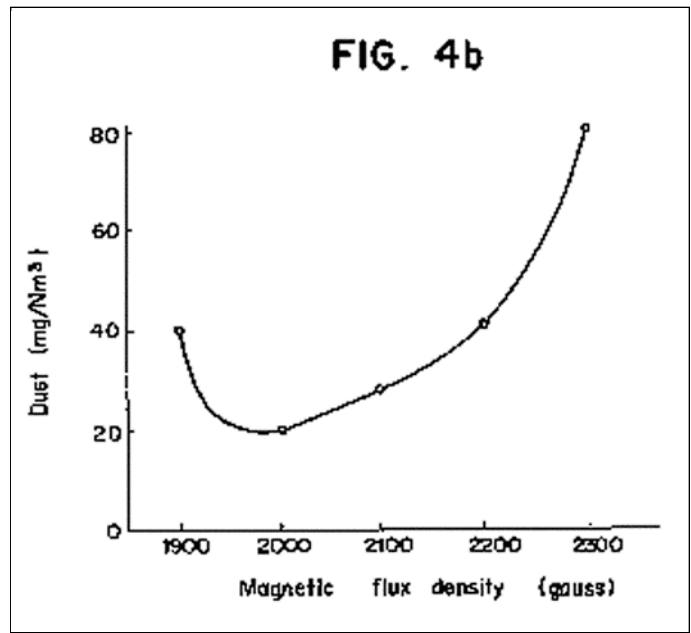
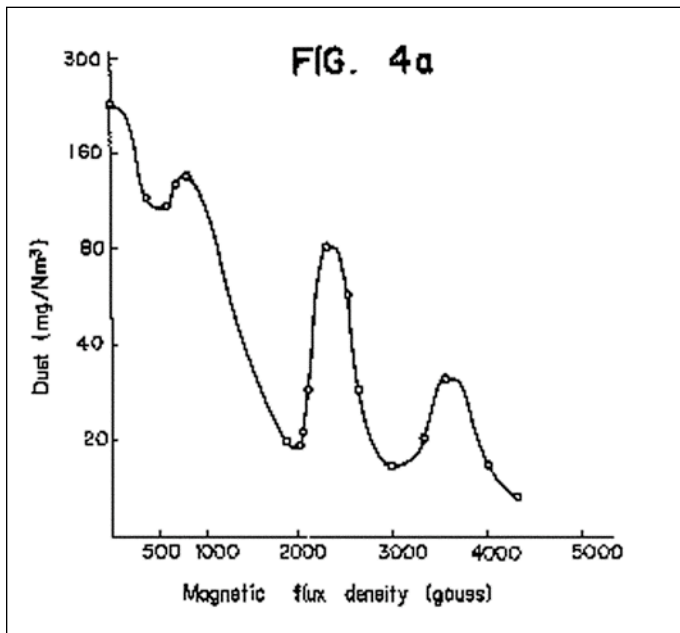
There is an added benefit in using the magnetic device to increase the seasonal energy efficiency ratio (SEER) or coefficient of performance (COP) of such systems. With the newer polar refrigerants, a polar miscible lubricant must be used. There have been some problems in the compatibility between certain lubricants and refrigerants which make them far less than ideally soluble. The lack of solubility prevents the lubricant from being returned to the compressor, thus shortening the life of the compressor.

Prof. Sami's research on this topic was published in *Air Conditioning/Heating/Refrigeration News*, which is searchable online ([www.achrnews.com](http://www.achrnews.com)). Prof. Sami's *International Journal of Energy Research* papers are available online at [www.magnetizer.com/hvac/hvac.htm](http://www.magnetizer.com/hvac/hvac.htm).

In industrial and commercial air conditioning systems, magnetic devices have been used on the refrigerant lines and on the chiller water going to the cooling tower, thus generating a double advantage. The advantages are in reducing the inefficiencies produced by mineral scale building on the heat exchanger surfaces as well as removing scale on the walls of the tower. Refrigerants that are affected magnetically require less electrical energy.

In the magnetic treating of tower water, it should be noted that the pH of the water tends to stabilize around a neutral pH of 7.0. The pH scale is logarithmic and obviously highly acidic or highly alkaline waters cannot be neutralized by effects, but waters that are in the low to mid-range 6.0 readings or mid to high 7.0 readings can find that the water will tend to stabilize at a pH of 7.0. Non-neutral waters, either of the hydroxyl or hydronium ion species, have ions in excess and by binding up the "excess" ions, water neutrality tends to be established. This effect is most pronounced in recirculation magnetic water systems.

In the patent of Hiram, (U.S. 493515, a magnetic treatment device), he relates the conversion of red iron rust water, FeO, over the black iron rust water, Fe<sub>2</sub>O<sub>3</sub>. Red iron rust water is soluble while black iron rust water is insoluble and precipitable. In the change from FeO to Fe<sub>2</sub>O<sub>3</sub> there is a change in the oxidation number-valence from +2 for iron in FeO to +3 for the iron valence in Fe<sub>2</sub>O<sub>3</sub>. The black form of iron is passivated and has less of a tendency to corrode, while red iron rusted material can continue to the point of decomposition of the initial structure.



Magnetic fuel treatment is a very interesting phenomena. What is not understood by many is that the effect is a non-linear effect, which means too high of a magnetic field can result in a diminished effect. This effect was first documented by Fujita in U.S. Patent 4188296; of especial interest is a series of curves that relates the most efficient levels of magnetic field to achieve ideal or stoichiometric combustion. Figure 4a (from the Fujita patent) shows a series of wave-like patterns that decline with increasing gauss levels indicating finer combustion rates, but along the waves are crests that reflect poor combustion. In summary, there are a series of "windows" of ideal treatment. Although it cannot be ascertained, it seems like the series of waves relate that a quantum effect is occurring. In science, many times proportionality is assumed, and in this case the effect is nonlinear and discrete levels of gauss must used to achieve positive results.

Magnetizer U.S. Patent 5829420 was invented to remove some of the capriciousness of magnetic fuel treatment. In this case an electromagnet is used in conjunction with a microprocessor which obtains data from combustion sensors whose data is heuristically evaluated and fed into a microprocessor that energizes the electromagnet to the appropriate level to insure "ideal" combustion.

To achieve green effects in buildings, permanent magnets can be made to specifications that assure that non-carbon dioxide emissions are minimized. Automotive emissions have different combustion environments: autos have high compressions and a relatively short time constraint on combustion, while boilers have ambient air and have far more time to allow complete combustion.

→ According to the *CRC Handbook of Chemistry and Physics*, natural gas or methane has by its symmetric structure no dipole moment. A Magnetizer was installed in a telephone switching building circa 1990 and a Honeywell Purple Peeper Device was installed to monitor the presence of the flame, which is in the 360 nm spectra. Twenty minutes after the installation, the monitor gave a quality of flame reading from the Purple Peeper of 2.0; prior to the installation the highest reading ever detected was 1.8. The combustion expert at Honeywell was contacted and given the details. Ulrich Bonne of Honeywell commented there must be some

mistake, that magnets cannot do that.

The U.S. Patent Office was not willing to grant Simon Ruskin a patent on his magnetic device for the conversion of parahydrogen missile fuel into orthohydrogen for increasing thrust performance of a rocket engine. According to the Federal Register a repository for Ruskins patent appeal, the Patent Office claimed the device was not patentable because the effect was obvious. Ruskin, one of the most prolific inventors, was granted U.S. Patent 3228868 eight years after filing.

Magnets can change the morphology of scale; in fact, the webpage by Prof. Simon Parsons of Cranfield University ([www.cranfield.ac.uk/sas/researchthemes/p9408.jsp](http://www.cranfield.ac.uk/sas/researchthemes/p9408.jsp)) shows the effect of a static magnetic field on water: before the crystalline scale structure is cubic, and after a brief exposure to the field the mineral scaling structures become spherical, non-scaling.

Magnetic devices can reduce toxic emissions from boilers, furnaces and the like as well as increase the performance of refrigerants used to cool buildings.

Magnetic treatment of water to decrease scale has been documented by many notable professors, such as Kronenberg, Parsons and Coey.

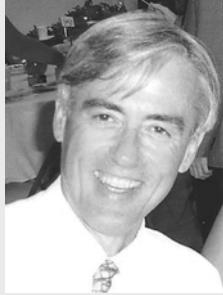
What is most disturbing is that a paper by Mike R. Powell in *Skeptical Inquirer* is used to debunk magnetic water treatment. A google search of "Mike R. Powell" engineer produces hits that are mainly related to debunking magnetic water studies. There are no "google scholar" papers published by him on any topic. His work at Pacific NorthWest Labs/PNNL/PNWL cannot be documented. No patents are issued to him. Yet, this article in *Skeptical Inquirer* tried to debunk Prof. Coey of Trinity College. Coey is very favorable on magnetic water treatment and has a reputable background. The abstract of his paper, "Magnetic Water Treatment," in the *Journal of Magnetism and Magnetic Materials* (February 2000; 209 (1), pp. 71-74) reads as follows: "Carbonates formed by heating water containing 120 mg (Ca)/liter are characterized by X-Ray diffraction and electron microscopy. Tests on 32 pairs of samples establish at the 99.9 probability level that drawing of water through a static magnetic field ( $B=0.1$  tesla, 10T/m) increases the arago-

nite/calcite ratio in the deposit. There is an incubation period of several hours, and the memory of magnetic treatment extends beyond 200 hours." See his website: [www.tcd.ie/Physics?Magnetism/Profile/mike.php](http://www.tcd.ie/Physics?Magnetism/Profile/mike.php).

Magnetic devices do not represent a "magic bullet" for the environment, but they do have utility in improving the quality of our air and water, providing that the limitations of this technology are viewed in a reasonable performance framework.

#### **About the Author**

Ron Kita holds a BS from Villanova (1967). He is an information scientist. He was formerly with Magnetizer Industrial Technology, where he was responsible for basic research and product development. Kita has three co-invented patents and two patent applications under consideration. He has published in *Frontier Perspectives* and the *International Journal of Energy Research*.



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