

Redhill Scientific



Our Technology

Redhill Scientific has developed a technology with broad potential in the agricultural, environmental remediation, and medical industries. We utilize exclusive patent licenses* on liquid film plasma reactor designs developed over 10 years at Florida State University. Our reactors create hydroxyl ($\cdot\text{OH}$) radicals formed by the dissociation of water by plasma generated within the chambers. The $\cdot\text{OH}$ can oxidize most oxidizable materials and compounds in both liquid and gas phases, and the technology is scalable, mobile, and simple to manufacture in a broad array of devices.

Use in Agriculture

We have created a plasma activated water (PAW) technology to supplant factory-scale nitrogen fertilizer production with a new type of agricultural equipment device that generates fertilizer on-site and on-demand. This new green technology replicates a naturally occurring process in lightning by combining air, water, and electricity to create enough fertilizer for any sized farm on location. The product of our technology is an aqueous solution of highly bioavailable fertilizer. Traces of hydrogen peroxide, a green disinfectant, are an additional valuable byproduct. Current nitrogenous fertilizer production is achieved using a 100-year old method that annually uses 650 million equivalent barrels of fossil fuels as feedstock and releases 1.7 trillion pounds of CO_2 into the atmosphere. Our new technology uses zero fossil fuels and has zero carbon releases from feedstock. These devices will enable farmers to replace an unavoidable recurring cost with a one-time capital purchase. Farm profits are dependent on stable input and output pricing, but stability can't be achieved currently since nitrogenous fertilizer prices are elastic and vary with rising and falling oil prices.

Use in Environmental Remediation

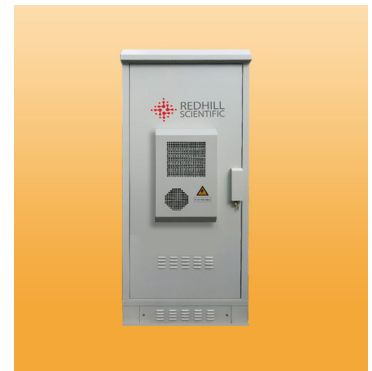
Our oxidizing plasma devices can be used to degrade numerous toxic organic compounds. While each remediation situation will be different in size and chemical complexity, in general, we can pump contaminated liquids or vapors through our device to quickly and effectively degrade them into biodegradable compounds. The technology is well suited to degrade a variety of common pollutants, including: biologicals (proteins, amino acids, nucleic acids), chlorine containing compounds (chlorocarbons and organochlorides) phenols (epoxies and resins), pharmaceuticals and personal care products (PPCPs), endocrine disrupting compounds (ECD), hormones, phytoestrogens, trichloroethylene (TCE)s and



*US Patents 7,919,053 and 8,444,924



Trichloroethane (TCA)s, benzene, kerosene, gasoline, and other petroleum fuels, diesel, crude, and other petroleum oils, perfluorinated compounds (PFCs), and dry cleaning solvents such as tetrachloroethylene (perchloroethylene- "PERC"). Our technology is scalable, and can potentially service cleanup efforts of many sizes. The high production rate and high efficiency of $\cdot\text{OH}$ generated in our reactor system (25% of thermodynamic limit) can potentially degrade a variety of common pollutants both in the liquid and gas phases at lower cost and higher effectiveness than many other existing remediation techniques.



The TFR 5 Nitrogen Fertilizer Unit is available now. See our website for more information: redhillscientific.com

Use in Medicine

Our technology creates an ultra-fine mist of highly reactive chemical species such as hydroxyl radicals ($\cdot\text{OH}$), hydrogen peroxide (H_2O_2), peroxyxynitrite, ozone, and nitric acid (HNO_3). Created onsite using only air, water, and electricity, these oxidizing compounds can be used to sterilize equipment before and after use, and to sterilize wounds to stave off potential infection. Our simple, safe, and small design architecture can potentially be utilized in a pen-like battery-powered device that sprays an antiseptic mist into a wound or onto surgical tools. Because of the small size, energy efficiency, simple and robust design, and no need for ingredients other than air and water, our natural early adopters can include austere medical treatment environments such as: developing world clinics, combat medicine, and even wilderness living and camping.



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