May 19, 2022
Meidensha Corporation

To whom it may concern.

Ultra-high concentration/high purity ozone water (400 mg/L or more) generated successfully

Excellent cleaning effects and reduced environmental impacts expected

Meidensha Corporation (Meiden) and its subsidiary Meiden Nanoprocess Innovations Inc. (Meiden NPI) have developed a generator for an ultra-high concentration/high purity ozone water jointly with EcoDesign, Inc., a manufacturer specializing in ozone-related products.

Having high oxidation power, ozone water is used for various purposes, including sterilization of viruses, deodorization, sewage treatment, and removal and cleaning of organic matter in semiconductor manufacturing processes. In particular, ultra-high concentration/high purity ozone water with higher concentration and purity has excellent cleaning capability. Its use as an alternative to conventional treatment with chemical solutions is expected to contribute to reducing environmental impacts.

Meiden is currently accepting requests for experiments on various samples and conducting market research and market development for the generator's commercialization. It plans to release a small-capacity model with a concentration of 300 mg/L and a flow rate of 1 L/min in fiscal 2022 ending on March 31, 2023, followed by an expanded product lineup that includes medium- and large-capacity models.

1. Features of the Product

The generator can generate ultra-high concentration/high purity ozone water exceeding 400 mg/L using high concentration ozone gas produced by the Pure Ozone Generator (POG), which is Meiden NPI's leading product. With the capability of generating ozone water with ultra-high concentration and high purity as added values that regular ozone water does not have, the product is expected to be used in a wide range of fields.

Ultra-high concentration/high purity ozone

Ultra-high concentration

While ozone water produced by conventional ozone water generators has an ozone concentration of several tens of mg/L, the new generator has been verified to be capable of generating ozone water with ultra-high concentration exceeding 400 mg/L using Meiden's original technique for dissolving ozone gas with nearly 100% concentration that is generated by POG. The product is expected to generate ozone water having a higher ozone concentration.

High purity

The purity of the ozone water has been examined by ICP-MS*4 analysis conducted at the ppb*1 level by a third-party organization, verifying that the content of each of the major metal elements is equal to or less than the lower limit of quantification. More accurate analysis at the ppt*2 level is planned in the future.

Unit : ppb

Measured element*3	Na	Cr	Fe	Cu	Al
Analysis result	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5

*1 ppb: parts per billion. 1 ppb is one billionth.

*2 ppt: parts per trillion. 1 ppt is one trillionth.

*3 The measured elements: Li, Na, Mg, Al, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Cd, Sn, Ba, Pb, Si

Please contact us for the measurement results.

*4 Inductively Coupled Plasma-Mass Spectrometry: This method is capable of simultaneously measuring very small amounts of multiple metal and nonmetal elements in an aqueous solution.

2. Effects of introducing the generator and applicable fields

- The ozone water's higher cleaning effects and reduced contamination (by impurities) ensure improved quality.

Customers can expect improved quality of their products as the high oxidation power achieved through the ultra-high ozone concentration is expected to treat organics that cannot be completely removed by conventional ozone water in a short time while minimizing contamination.

Application: Semiconductor field (cleaning/resist removal/surface modification), etc.

- Reduction of environmental impacts

Since ozone water decomposes into harmless water and oxygen, the burden of wastewater treatment involving capital investment and running cost can be less than that of conventional chemical treatment.

Application: Semiconductor field (being more environment-friendly by replacing cleaning solutions), etc.

- Sterilization and disinfection effects by powerful oxidation reaction

Sterilization/disinfection effects can be expected due to the powerful oxidation reaction made possible by the overwhelming amount of ozone. In addition, the high purity ozone water that does not contain heavy metals or hazardous substances ensures safety and peace of mind for customers, especially in the medical and foodstuffs fields.

Application: Medical field (sterilization/disinfection/advanced medicine), foodstuff field (sterilization/disinfection and preservation), etc.

3. For inquiries and sample requests regarding the product, contact

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Ultra-high concentration/high purity ozone water generator (right),
and Pure Ozone Generator (left)

■ What is Pure Ozone Generator?

The Pure Ozone Generator is a device for continuously generating ozone gas of nearly 100% concentration and is almost totally free of impurities such as heavy metals. It has a thoroughly safe design that is the result of many years of research by Meiden to ensure the safe use of toxic and explosive ozone gas and its stable supply. The technology for continuously generating pure ozone in this way is proprietary to Meiden NPI and its co-developer, the National Institute of Advanced Industrial Science and Technology (AIST). Their partnership related to pure ozone research and development has earned many patents in Japan and overseas.

For more information on Pure Ozone Generator, visit:
https://www.meidensha.co.jp/npi/products/prod_01/index.html (in Japanese); and
https://www.meidensha.com/products/industry/prod_03/prod_03_07/index.html (in English)

■ Meiden's research and development related to ozone gas

Meiden began research and development related to ozone gas in 1998. It started joint research with the National Institute of Advanced Industrial Science and Technology (AIST) in 2001. In 2002, they developed a device capable of continuously generating high purity ozone. In 2012, Meiden sold its first Pure Ozone Generator to a manufacturer related to the semiconductor sector. In April 2020, Meiden spun off this business and established Meiden NPI as part of its strategy to set up a base to spur innovation for flexibly expanding business. Meiden NPI is continuing the development of processing technologies using pure ozone and proposing ways to use them so that the company can develop sales channels for the Pure Ozone Generator — a new business model it is pursuing.

■ EcoDesign, Inc.

Location: 510-1 Kamifurutera, Ogawa-machi, Hiki-gun, Saitama Prefecture
Business areas: Production and sales of ozone generators, design and production of experimental equipment, R&D consulting
Visit: https://www.ecodesign-labo.jp/