Diamond electrodes - water cleaning by diamond particles

Source:

pro aqua Diamantelektroden Produktion GmbH

Section:

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Company: pro aqua Diamantelektroden Produktion GmbH

Location: Niklasdorf, Austria

Description:

The company pro aqua Diamantenelektroden Produktion GmbH, founded in 2004 from a spin-off of the Montanuniversität Leoben, is concerned with the concept of water purification by plastic diamond electrodes. This innovation is used extensively in the cleaning and quality assurance of drinking water, process water, sewage, bathing and swimming pool water and other liquid media.

Pro aqua Diamantenelektroden Produktion GmbH has an economically efficient fluorine-based diamond electrode technology, which has neither a passivation effect (formation of an oxide layer at the interface between diamond and carrier material) nor a material expansion effect (different material expansion coefficients of carrier material and diamond). Diamond particles of up to 250 ?m in size, whose electrical conductivity is given by a boron doping, are integrated into the plastic plates in such a way that they are in contact on both sides with the medium to be treated.

In the innovative method of water purification by means of diamond electrodes, the method of anodic oxidation is used. As can be seen in the figure, the diamond electrodes are located between the contacting electrodes. Depending on parameters such as conductivity, degree of contamination, reactor size, supply voltage, etc., two or more diamond electrodes are installed in flow cells. Owing to the application of direct voltage to the contacting electrodes, oxidizing agents (eg ozone, hydrogen peroxide, hydroxyl radicals, chlorine) are formed directly from the liquid to be cleaned on the diamond electrodes. These in turn build up organic impurities in-situ in the liquid to carbon dioxide and water. On the other hand, the biological activity or the formation of microorganisms is prevented and the liquid to be purified is disinfected (sterilized).

The method is designed for two different applications. The first case is an in-situ treatment in which the contaminated medium is pumped through the cell. Oxidants are produced from the medium and its constituents, which in turn kill the bacteria or decompose the organic cargo (COD reduction). The in-situ treatment is in principle to be adapted to the particular application and is mainly used in drinking, process, waste water and bath water treatment. In the second case, a defined salt water solution (drinking water + food salt) is passed through the cell. With this procedure, an electrolysis water with a defined oxidizing agent content of e.g. 150 ppm (chlorine equivalents). This water is particularly used in the food industry for cleaning and disinfecting plants and surfaces but also for washing fruit and vegetables.

Diamond electrodes of pro aqua Diamantenelektroden Produktion GmbH have already proven themselves in a wide range of applications:

- Removal of drug residues from municipal sewage
- Reduction of industrial chemicals BTEX in industrial wastewater
- Treatment of oil-water emulsions
- Disinfection of biologically pre-treated sewage from alpine huts / shelters
- Stabilization of rainwater for use of domestic water
- Production of active oxygen for bath water disinfection
- Cleaning and disinfecting plants in the food industry
- Washing fruit, vegetables and lettuce to increase the shelf life

Further information: LINK

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