

Non-thermal plasma pollution control systems

Ecozone Technologies Ltd., Israel, has developed double dielectric barrier discharge (DDBD) technology, also known as silent discharge plasma (SDP), to treat extremely hazardous gases such as VOCs, NO_x, PFCs, SO_x, etc. This technology has led to a prototype Plasma Pollution Control (PPC) system with the ability to treat heterogeneous gases by applying non-thermal plasma electric field directly to the polluted gas stream.

In the Ecozone PPC non-thermal plasma discharge reactor, energy is provided through a high-voltage power supply. This high voltage and the corresponding high electric field is applied to a patent-pending criss-cross structure of electrodes. As the working gas passes between the electrodes, the applied field breaks down the gas, thereby creating partially ionized plasma. At atmospheric pressures, this breakdown results in a multitude of current filaments, referred to as microdischarges. Since the discharges do not last long, the electrons and heavy particles do not thermally equilibrate; the temperature of the electrons is in the order of 3-8 eV, while the bulk gas (heavy particles) temperature is approximately constant. The relatively large collisional cross-section between 3-8 eV electrons and most molecules leads to collisions between these energetic electrons and the atoms/molecules, thereby resulting in the formation of excited atomic/molecular states and the other highly reactive species.

After a discharge extinguishes, the created reactive species collide with other species, causing chemical reactions that alter hazardous compounds into benign, more controllable or simpler compounds. *Contact: Ecozone Technologies Ltd., Hataas 24, P.O Box 2393, Kfar-Saba 44641, Israel. Tel: +972 9765 6183/9765 5639; Fax: +972 9765 6830; E-mail: info@ecozone.co.il.*