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## Dielectric-Barrier Discharges. Principle and Applications

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## Abstract

Dielectric-barrier discharges (silent discharges) are non-equilibrium discharges that can be conveniently operated over a wide temperature and pressure range. At about atmospheric pressure electrical breakdown occurs in many independent thin current filaments. These short-lived microdischarges have properties of transient high pressure glow discharges with electron energies ideally suited for exciting or dissociating background gas atoms and molecules. The traditional application for large-scale ozone generation is discussed together with novel applications in excimer UV lamps, high power CO<sub>2</sub> lasers and plasma display panels. Additional applications for surface treatment and pollution control are rapidly emerging technologies. Recent results on greenhouse gas recycling and utilisation in dielectric-barrier discharges are also discussed.

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The Dielectric Barrier Discharge (DBD) is now one of the most popular plasma discharge schemes and electrode configurations especially for atmospheric pressure plasma application. DBD has widely been used in various fields like semiconductor packaging, flat panel displays, optical films and solar cells, etc. DBD is highly non-equilibrium plasmas that provide high density active species including radicals, energetic electrons and ions but still has moderate gas temperature. Due to this characteristic of DBD discharge, it can be applied to thermally weak polymeric materials and even living cells