CeraPlas™-
cold plasma for sensitive applications

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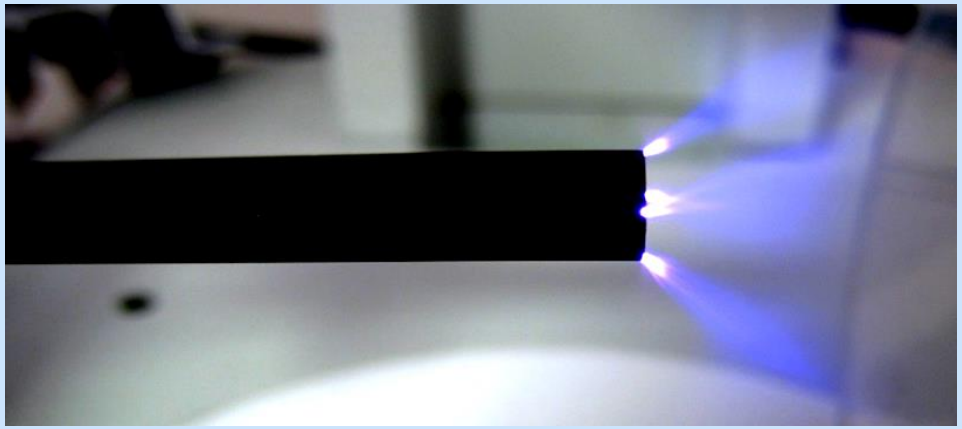
TDK

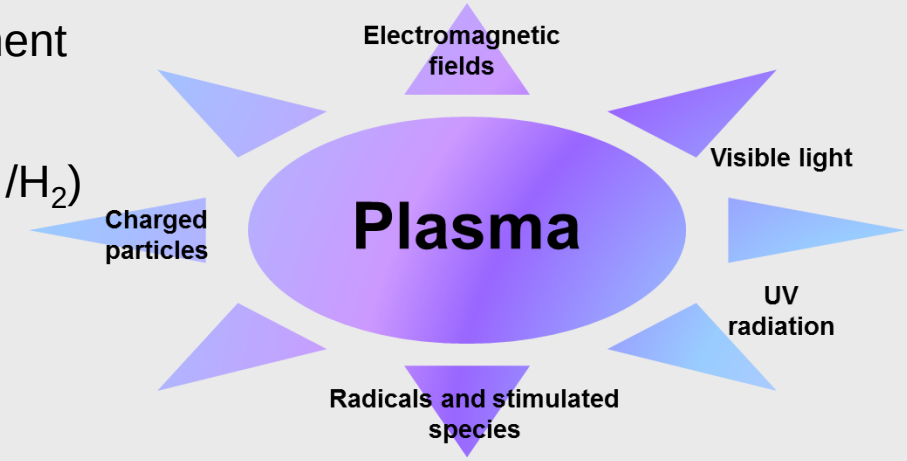
CeraPlas™ enables compact cold plasma solutions



- A completely new kind of plasma generator – Piezoelectric direct discharge technology (PDD)
- Based on ceramic multilayer technology with co-fired hard PZT ceramics and copper electrodes

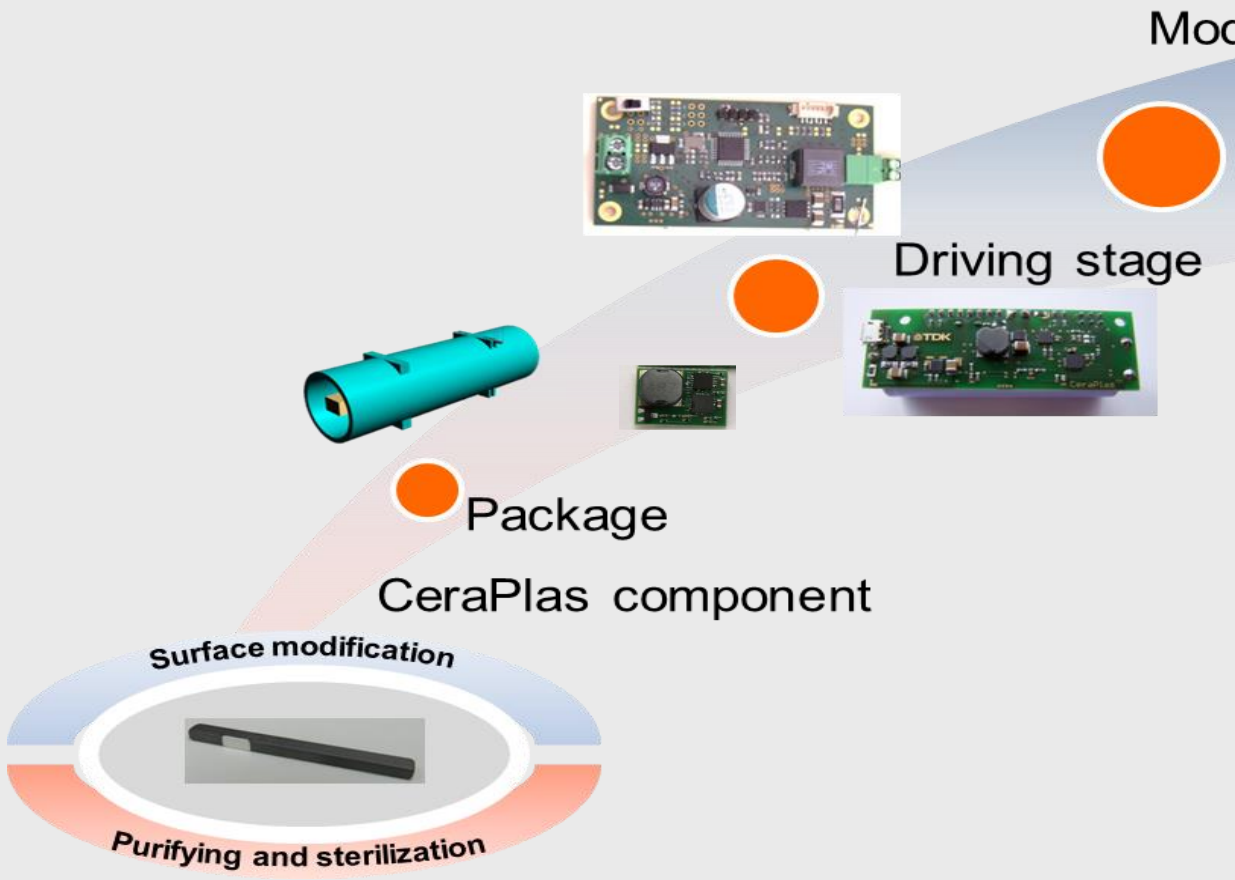
CeraPlas is an ideal component for generating cold plasma

- Voltage supply and plasma generation combined in a single component
- No special plasma generating electrode required
- Ignition directly in air or in industrial gases (e.g. Ar, N_2, He, Ar/O_2, N_2 /H_2)
- No high-voltage plugs or cables needed
- Low plasma temperature (< 50 °C)
- High effective plasma generation
- Small and light and therefore well suited for handheld devices



CeraPlas™ - from component to module

- CeraPlas™ component available
- CeraPlas™ package for easy plug and play set up available
- Driving stages available
- Battery driven modules possible



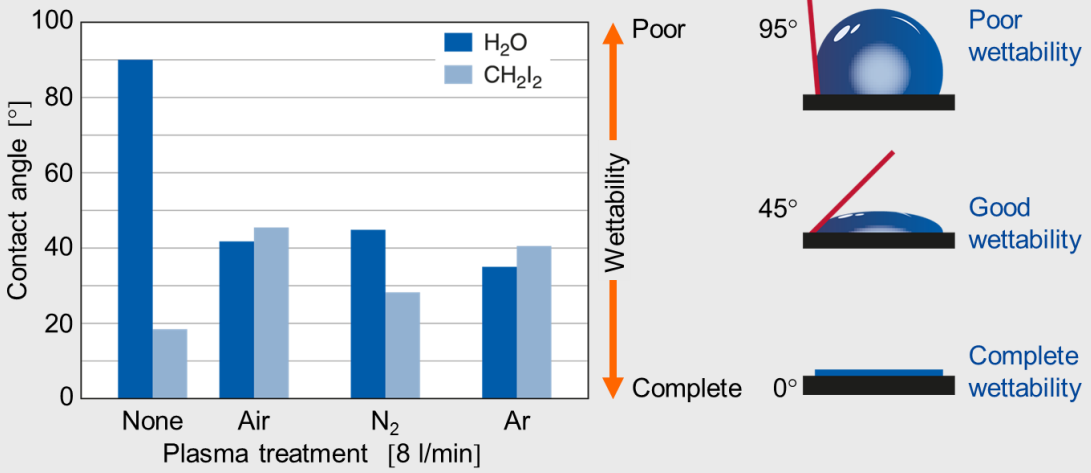
Typical CeraPlas™ performance parameters	
Dimensions	45 x 4 x 2,8 mm
Power consumption	< 5 W
Plasma temperature	< 50°C
Ion density	> 10^{13}/m³
Electron density	10^{14} – 10^{16}/cm³

Application studies CeraPlas™ PDD plasma

Functionalization of temperature sensitive materials:

Functionalizing with the CeraPlas™ PDD plasma leads to

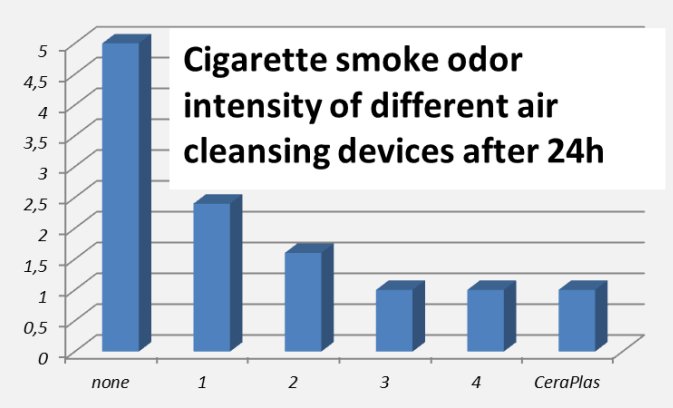
→ better adhesion to surface due to increase of surface energy up to wettability of water

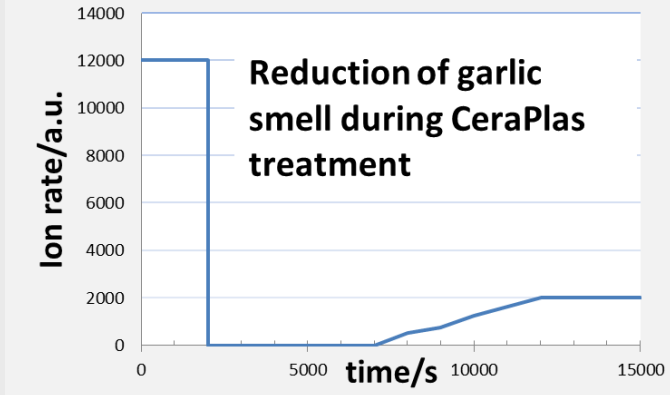


Effect on odor:

Treatment of smell with CeraPlas™ PDD plasma leads to

→ Significant reduction of odor





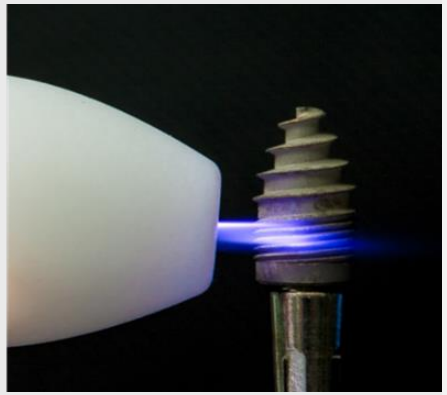
CeraPlas™ enables a very effective functionalization of sensitive materials and features a significant reduction of odor at a very low power input.

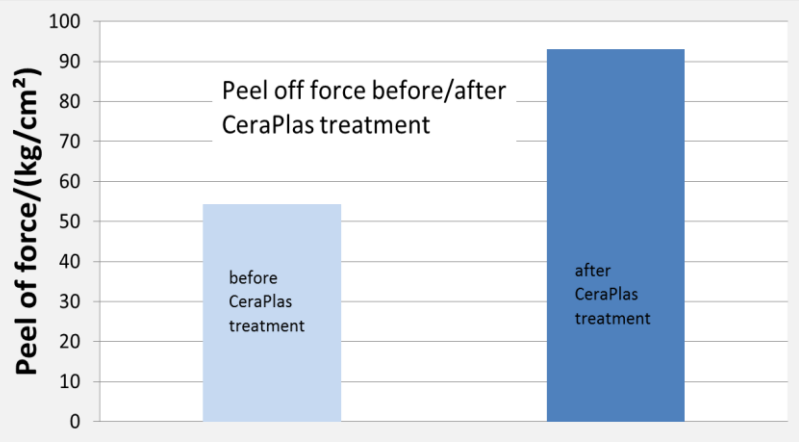
Application studies CeraPlas™ PDD plasma

Functionalization of high performance plastic e.g. PEEK:

Functionalizing with the CeraPlas™ PDD plasma leads to

- → better bonding to organic tissue due to increase of surface energy up to wettability of water
- → decontamination of surface to decrease risk of infection

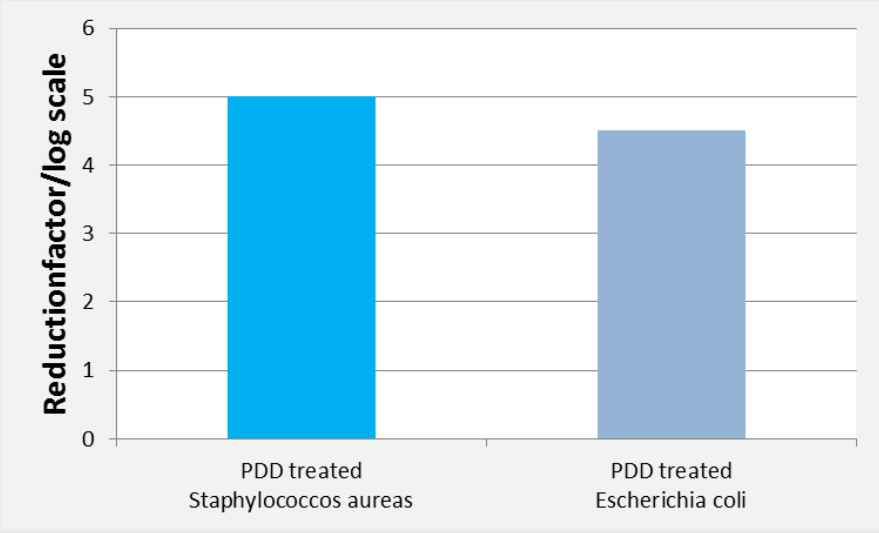


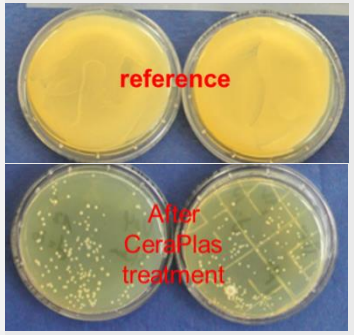


Effect on microorganism:

Treatment of microorganisms with CeraPlas™ PDD plasma leads to

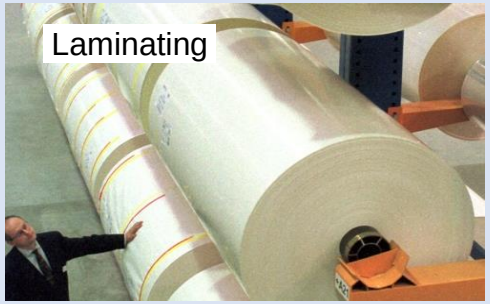
- → Significant decrease of growth rate achieved





CeraPlas™ enables a very effective functionalization of sensitive materials and features a significant decrease of growth of microorganism at a very low power.

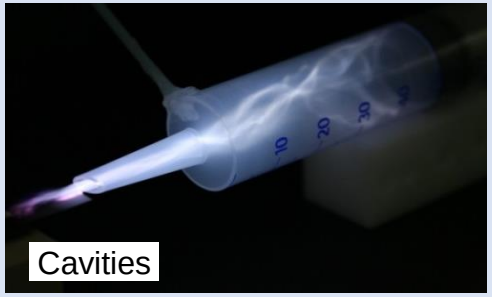
Cold Plasma has a wide spectrum of potential uses!



Surface modification

Plasma requirements
- Cold temperature
- Atmospheric pressure
- Air as process gas

Cleaning and purifying



Application Examples
• **Consumer:** Food quality, air cleansing
• **Industrial Printing:** Increased surface wettability
• **Medical:** Wound Treatment, disinfection
• **Manufacturing:** Plasma supported lamination
• **Dental, Cosmetics:** Surface treatment, sterilization
• **Manufacturing:** Cleaning of temperature sensitive materials e.g. plastics, textiles, tissue
• **Automotive:** HVAC cleaning
• **Manufacturing:** Surface functionalization for bonding and gluing