

# Laboratory of Low Temperature Plasma Processes

## Current research works

- Development of plasma-catalytic processes for CH<sub>4</sub> and NO<sub>x</sub> conversion.
- Designing the GlidArc discharge reactors for decomposition of the wastes (e.g. chlorinated hydrocarbons).
- Designing and development of surface discharge reactors for ozone synthesis, polymer surface treatment and bacterial deactivation.
- Development of Plasma Vapor Deposition methods for obtaining the silica thin-layers and the surface treatment.
- Plasma deposition of organic coatings on plastics (films), used in the manufacture of packaging (e.g. polyethylene, polypropylene or polyester) to decrease the permeability of water vapor and gases such as oxygen or carbon dioxide.

## Selected publications

- A.Górska, K.Krawczyk, S.Jodzis, K.Schmidt-Szałowski, *Non-oxidative methane coupling using Cu/ZnO/Al<sub>2</sub>O<sub>3</sub> catalyst in DBD*, Fuel, 90 1946-1952 (2011)
- S.Jodzis, *Application of technical kinetics for macroscopic analysis of ozone synthesis process*, Ind. Eng. Chem. Res. 50(10), 6053-6060 (2011)
- J. Sentek, K. Krawczyk, M Młotek, M. Kalczewska, T. Kroker, T. Kolb, A. Schenk, K.-H. Gericke, K. Schmidt-Szałowski, *Plasma-catalytic methane conversion with carbon dioxide in dielectric barrier discharge*, Appl. Cat. B: Environmental 94, 19-26 (2010)
- S.Jodzis, T.Smoliński, P.Sówka, *Ozone Synthesis Under Surface Discharges in Oxygen: Application of a Concentric Actuator*, IEEE T. Plasma Sci. 9(4) 1055-1060 (2011)
- T. Kroker, T. Kolb, K. Krawczyk, M. Młotek, A. Schenk, K.H. Gericke, *Catalytic Conversion of Biogas in a Fluidized Bed Reactor Supported by a DBD*, Frontier of Applied Plasma Technology, 3(2), 69-73 (2010)
- K. Krawczyk, S. Jodzis, A. Lamenta, K. Kostka, K. Schmidt-Szałowski, *Badania rozkładu tetrachlorometanu jako substancji modelowej w środowisku plazmy wyładowań iskrowych*, Przem. Chem. 89(8), 1101-1106 (2010)



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## Research profile

Plasma and plasma-catalytic processing of particularly stable substances and environmentally harmful and toxic materials present in industrial waste

Destruction of volatile organic compounds

Decomposition of NO<sub>x</sub>, SO<sub>2</sub>, CH<sub>4</sub>, CCl<sub>4</sub>, C<sub>2</sub>H<sub>2</sub>, H<sub>2</sub>S, N<sub>2</sub>O and CH<sub>3</sub>SH and other toxic and stable substances

Studies on various kind of discharges: barrier, surface, spark, glow, gliding arc, corona, and semicorona (DC, AC, pulsed), microwave and electron beam

Ozone synthesis under surface and coplanar discharge conditions

The coupling of methane to higher hydrocarbons at atmospheric pressure under gliding discharge and barrier discharge conditions