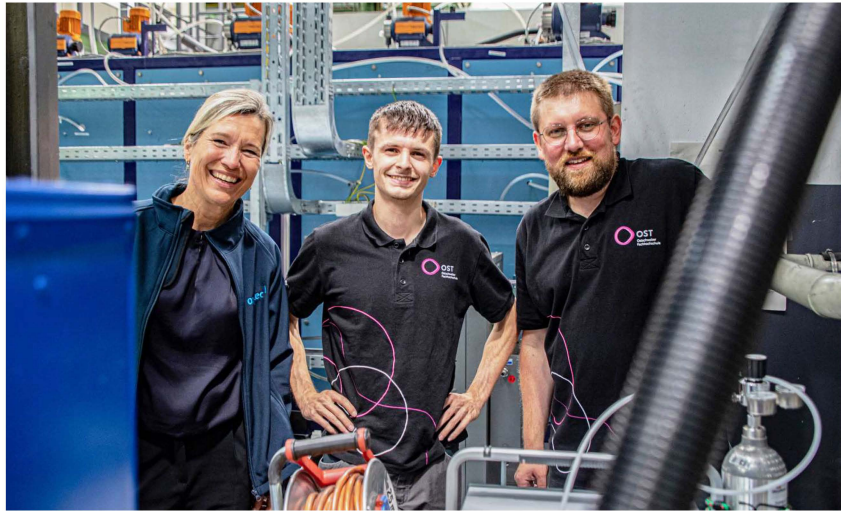


Plasma cleaning of industrial emissions

At the push of a button

The purification of industrial waste gases is critical for an environment worth living in. Without it, the world would be back in the 19th century very quickly: Smog in urban areas, poisoned waters, dying forests. Today, industrial exhaust gases are mostly burned with natural gas to be purified before being emitted into the environment. But this causes climate-damaging CO₂ emissions. A plasma cleaning system developed at OST has the potential to change that: It is powered by electricity and was recently tested with great success in a battery recycling factory.



Large amounts of emissions are produced in many industries, including cement and concrete plants, distilleries, waste incineration plants, commercial kitchens, and various factories. What once contributed to smog-filled cities and polluted water up to the 20th century is now a thing of the past thanks to air quality laws.

Most industries today rely on fossil fuels for exhaust gas purification: To burn off the pollutants in the exhaust gases, for example, the exhaust gases are pre-treated with filter systems before they are burned with natural gas in afterburning plants. What remains is water and CO₂, both of which are then released into the environment. As climate change progresses, the associated CO₂ emissions are no longer desirable.

In search of new solutions, Oxytec AG, specialised in air and water purification, partnered with the UMTEC Institute for Environmental and Process Engineering at OST to develop a plasma-based cleaning system.

Instead of the conventional combustion at 850 to 900 degrees Celsius, the exhaust gases are passed through cold plasma. Only two things are needed for this: air and electric current. "Our prototype was able to clean various exhaust gas test mixtures in the laboratory at the push of a button - the advantage here is also that no preheating is necessary and only a little waste heat is generated," explains UMTEC environmental engineer Bastian Welte.

This summer, the prototype from the laboratory was installed in the normal operation of a battery recycling plant of the company Primobius GmbH (member of the SMS Group) in Germany. After several months of operation with waste gases from battery recycling, UMTEC project manager Andre Heel draws a very positive conclusion: "We were able to show that our system can be integrated into the existing infrastructure and can provide the required cleaning performance. If the system is scaled up, exhaust gas flows on an industrial scale of up to several hundred thousand cubic metres per hour are possible."

Full performance at the push of a button

A major advantage of plasma cleaning compared to fossil combustion systems is its simple operation. Because the plasma can be generated immediately in the reactor with electric power, the full cleaning capacity is generated at the push of a button. No warm-up times or systems for utilizing waste heat are necessary. "This is important, because many companies don't even have a use for such large amounts of waste heat, and such systems would cause unwanted complexity and costs," says Welte. Moreover, the logistics and transport infrastructure for fossil fuels are eliminated. The UMTEC researchers are therefore confident that they have made a significant contribution to industrial exhaust gas cleaning. "Overall, exhaust gas cleaning becomes less complex and more environmentally friendly with our plasma-chemical cleaning. In addition, it takes into account current developments: away from fossil fuels and towards the electrification of processes," says Heel.

After the successful test operation, Oxytec AG wants to work together with UMTEC on the commercialisation of the system. The market demand in the industry is there. — MeWi

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**«Innovative technology
and a great team result in
an excellent result.»**

Horst Krenn, Managing Director Primobius GmbH

