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CO₂-neutral mobility as a challenge and opportunity for plasma surface technology throughout the energy chain

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For tomorrow's sustainable mobility, we will need to develop new technologies that are more efficient and, above all, less pollutant while consuming fewer fossil resources. There exist three basic paths to sustainable mobility in the future: Battery electric mobility, fuel cells powered by green hydrogen, and hydrogen-based e-fuels for already existing fleets using combustion engines. Over the next years, our challenge as an industry is to industrialize all three types of solutions. These developments will, in turn, lead to a sharp increase in renewable energies and the respective impact on the energy system. Therefore, the mobility transition requires an energy transition. Plasma technology plays an important role not only in the mobility transition but also in the energy transition. Schaeffler has already successfully developed completely new coating systems particularly in the field of system components for energy storage and conversion. For instance, plasma technology coated metallic bipolar plates offer increased performance in terms of lifetime and operation modes at different voltage levels. This improvement has been achieved with a coating system using a nanostructured architecture combining different material groups of metals, nitrides and carbides. Energy efficiency still remains of central interest across all energy-related applications, including both traditional combustion engine technology and new propulsion concepts. Schaeffler has developed several thin film solutions that focus on the improvement of energy efficiency by improving friction performance and wear resistance. These coatings are already being used today in a wide variety of products. A key aspect for future improvements is the challenge of the development and application of tailored coatings which can interact adaptively with the lubricants and their additives. For a successful mobility and energy transformation the close cooperation between science, industry and politics, as well as a fast transfer of research and development results into economic and robust mass production, is of critical importance.

Keywords

mobility and energy transition

energy storage

tribology