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PVD/PECVD technologies for eco-friendly mobility

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More than two decades have been passed since the first commercial scale production of PVD coating on automotive components; which was CrN coating on shoes for compressors of car air conditioners. Since then, plasma-based coating technologies have become popular as surface technologies to achieve eco-friendly mobility. From the beginning of industrialization, CrN has been most commonly applied to various components and the most successful application would be piston rings. Today, CrN coating on piston ring is indispensable technology to reduce the friction in automotive engines. As an equipment supplier, we have been deeply involved in this commercialization through the development and supply of innovative equipment. In the last decade, Diamond-like carbon (DLC) coatings with both low friction coefficient and high hardness have become popular. As discussed elsewhere, there are many processes for DLC deposition, including arc evaporation, sputtering and PECVD. And various types of DLC coatings, including hydrogen free DLC, hydrogenated DLC, metal doped DLC, have been commercially applied to various automotive components; fuel supply systems, parts in valve trains, piston rings, and parts in drive trains. For DLC coating we have been supplying numbers of UBMS and PECVD systems, and recently we commercialized new arc sources for carbon evaporation for ta-C deposition.

This paper will give a historical overview of applications of plasma-based coatings to automotive components, and then will focus on recent advance in deposition technologies, including arc evaporation, sputtering and PECVD equipment.

Keywords

PECVD

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