

OR1906

Anticorrosion studies for pipe organ-related materials using plasma processing

Wolfgang Skorupa¹, Charaf Cherkouk¹, Dietmar Henke¹, Slawomir Prucnal¹, Helfried Reuther¹, Helmut Werner², Dirk Pfeifer², Anne-Christin Eule²

¹Helmholtz-Zentrum Dresden-Rossendorf, 01314 Dresden, Germany ²
Hermann Eule Orgelbau GmbH, 02625 Bautzen, Germany

w.skorupa@hzdr.de

There is no doubt that lead (and its alloys with tin) and brass materials do not really belong to the stuff of primary interest for advanced materials studies. Also, lead gets more and more removed from the technology of soldering in electronics etc., and brass is, at least, a material of doubtful character if treated in vacuum. On the other hand these metals are of primary interest for the construction of pipe organs, and that already for millenia! Corrosion of lead and brass are a serious obstacle in old and even new pipe organs if the microclimate inside of the organ, the church, the concert hall etc. is containing special residuals or impurities leading to the growth of corrosive layers. Finally, even holes can be "drilled" into metal pipes making them voiceless!

For this end we have started to fight with this problem by using nanotechnology to cover metallic sheets of lead and brass with thin layers of anticorrosive material. Plasma immersion ion implantation of nitrogen was used to keep the technology simple and to have certain intermixed interface layers between the surface and the substrate. AES and XPS demonstrated surface layers with a thickness in the range below 50 nm. The exact composition and mechanism is a matter of discussion yet. Laboratory-based corrosion studies were developed and applied to the plasma-treated surfaces. First results were quite promising and showed strong corrosion resistance, especially for lead. Field studies at historical organs in Saxony and Mecklenburg are ongoing.

Keywords

pipe organ
plasma immersion
corrosion protection
lead
brass