ORA302

Computer-aided engineering of industrial PVD and PECVD coating chambers: past victories, future challenges

Adam Obrusnik, Petr Zikan, Martin Kubečka, Kryštof Mrózek

PlasmaSolve s.r.o., Brno, Czech Republic

obrusnik@plasmasolve.com

Computer-aided engineering (CAE) is the go-to engineering tool in many fields of industry. In recent years, the growing availability of high-performance computing and scientific advancements in coating fundamentals enabled predictive industry-grade simulation of some coating processes. We discuss, from the perspective of an industrial coating CAE provider, what computational models are available, what are their predictive capabilities and what level of 2D/3D geometrical detail can be simulated. This is done for the most common vapor deposition techniques - reactive and non-reactive DC sputtering, arc evaporation, HiPIMS and DLC PECVD. Apparently, some process models are already so mature that they enable ab-initio prediction of coating uniformity, composition or even properties. Concerning the less mature models, we discuss the technical and scientific challenges, standing in the way of reliable CAE of coating systems.

Keywords
coating
simulation
model
pvd
pecvd