

**Towards sustainable catalytic coatings – merits and challenges of hollow cathode gas flow sputtering as a potentially large scale / high volume coating technology.**

Sputtering remains the most relevant deposition route for the large area industrial technologies over decades. Rigorous process control provides deposition of complex layer stacks with high reproducibility and precision. However some issues remain. Among them: (i) high density of crystalline films; (ii) high crystallinity at low temperatures; (iii) compositional flexibility.

Recently the unipolar generators being able to provide pulses with adjustable reverse voltage in a middle frequency range was introduced by TRUMPF Hüttinger GmbH. Their application makes hollow cathode reactive gas flow sputtering (GFS) process more powerful in terms of the film growth conditions. We present in this regard our results obtained on the small laboratory GFS system equipped with such generators from Hüttinger. Mainly TiO<sub>2</sub>, SnO<sub>2</sub> and Cu<sub>2</sub>O oxides are considered. Films were characterised by ellipsometry, UV-Vis spectroscopy, scanning electron microscopy (SEM) and X-ray diffraction XRD. Based on the acquired data the simplified model describing the impact of statistically valuable variables (deposition temperature, gas flows, generator settings etc.) onto film properties (crystallinity, refractive index, porosity etc.) was created. These results are supposed to be general and can be useful for up-scaling.