Silver-coated surfaces such as, e.g., foils, membranes, textiles, and fibers, are used for their electrical, optical and antibacterial properties. Pure silver surfaces react with hydrogen sulphide in air leading to tarnishing and with oxygen dissolved in aqueous solutions resulting in Ag ion release. While the latter is responsible for the antibacterial properties, a high Ag release can also lead to an undesirable cytotoxic effect. A passivation is thus required that does not change the electrical and optical properties, but limits Ag sulfidation and its ion release.

As passivating adlayer the deposition of an ultrathin metal titanium film using magnetron sputtering was examined. The naturally formed titanium oxide as well as the Ti/Ag interface is investigated for its stability in humid and aqueous environments using XPS depth profiling. Ion release measurements show an efficient control over the release properties depending on the thickness of the Ti adlayer. Initial burst release of the pure metal Ag surface can be avoided by a 3-15 nm thick adlayer that also prevents tarnishing and maintains the electrical properties.

Such Ti/Ag coatings are used on foils for heat reflection and antistatic properties. Deposited on textiles and fibers high fashion and smart textiles are enabled. Electrically conductive fibers are, e.g., used as body electrodes for long-term electrocardiography (ECG) measurements. By TiO\textsubscript{x} passivation possible cytotoxic conditions for moistened electrodes are avoided.

Reel-to-reel plasma coating systems are developed for web and fibrous substrates enabling the silver and titanium coating in a one-step process. The plasma deposition of Ti/Ag coatings could thus be transferred to an industrial process.

**Keywords**
- magnetron sputtering
- silver release
- passivation
- contact resistance
- diffusion barrier