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**NANOCOMPOSITE GOLD/PEO-LIKE PLASMA POLYMERS**

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Poly(ethylene oxide) (PEO) as well as gold nanoparticles are very well known in biomedical field. PEO is remarkable for its non-fouling properties and as drug delivery medium whereas gold nanoparticles are widely studied as biomolecule targeting agents. This work attempts to combine both in one by plasma-based techniques. Nanocomposite Au/PEO-like plasma polymer films were deposited by simultaneous magnetron sputtering of a gold target and plasma-assisted vacuum evaporation of classic PEO. The power at the magnetron and the evaporation rate were controlled independently. Chemical, physical properties of the nanocomposites as well as their structure were studied by XPS, FTIR, UV-Vis and TEM in dependence on magnetron power and evaporation rate. The films with 3, 5, 17, 33 and 37% of gold were prepared. Cross-linking density of the plasma polymer increased with increasing concentration of gold whereas the concentration of the COC groups decreased from 75 to 45%. The TEM showed that at lower filling gold is dispersed in a matrix of the plasma polymer in the form of nanoparticles with a wide size distribution. Such structure manifested in UV-Vis spectra as a surface plasmon absorption band at 550-580 nm. A percolation threshold was observed at the gold filling >30% where interconnected channels of gold were mediated by small areas of the plasma polymer. Interaction of these nanocomposites with aqueous media was studied by QCM.

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