Fig. 1.2 Illustrative presentation of self-assembly monolayer technique and schematic structure of the resulting SAM film [6].
Fig. 1.3 A. Schematic of the LbL film assembly process using slides and beakers.

Step 1 and 3 represent the adsorption of a polyanion and polycation, respectively, and step 2 and 4 are washing steps. The four steps are the basis build-up sequence for the simplest film architecture. B. Simplified molecular picture of the first two adsorption steps [25].
Cobalt-tetra(N-methyl-4-pyridyl)-porphyrin cation

PdCl$_2^-$, tetrachloropalladate anion

Pd nanoparticle
Iron-tetra(N-methyl-4-pyridyl)-porphyrin cation

PtCl$_2^-$, tetrachloroplattinate anion

Pt particle

CV (reduction)
Fig. 4.3.1

PDDA, poly(diallyldimethylammonium) cation

AuCl₄⁻, tetrachloroaurate anion

Au particle

Polycation

UV or CV (conversion)
Cobalt-tetra(N-methyl-4-pyridyl)-porphyrin cation
PdCl$_2^-$: tetachloropalladate anion
PtCl$_6^{2-}$: tetrachloroplatinate anion
Pd-Pt bimetallic nanoparticle
Cobalt-tetra(N-methyl-4-pyridyl)-porphyrin cation

$\text{PdCl}_2^+$ $\text{PtCl}_4^-$

Pd-Pt bimetallic nanoparticle
Fig. 5.2.1

Cobalt-tetra(N-methyl-4-pyridyl)-porphyrin cation

PdCl$_2$\textsuperscript{2+}, tetrachloropalladate anion

AuCl$_4$\textsuperscript{-}, tetrachloroaurate anion

Pd-Au bimetallic nanoparticle

quadri-layer unit

CV (reduction)
Cobalt-tetra(N-methyl-4-pyridyl)-porphyrin cation
PdCl$_2^-$, tetrachloropalladate anion
AuCl$_4^-$, tetrachloroaurate anion
Au nanoparticle
Pd-Au bimetallic nanoparticle
Fig. 6.1

Electrochemical reduction in KAuCl₄ solution

PDDA, poly(allyldimethylammonium) cation

PSS, poly(sodium 4-styrenesulphonate) anion