

A novel approach of multilayered thin film based on layer-by-layer deposition using colloidal nanoparticles was carried out in this work. The films were made by the self-assembly of oppositely charged metal and dielectric nanoparticles, alternately capped with polymers. Synthesized colloidal suspensions of gold nanoparticles (~20nm) and silica nanoparticles (~30nm) were used as the building blocks for the self-organisation of the films. Capping with PDDA and chitosan was used effectively to control the optical absorption of the surface plasmon resonance peaks of the gold nanoparticles. Using different combinations of layer formation, absorption characteristics in the near-ultraviolet (NUV), green and blue region were controlled through capping and varying the thickness of the film. Capping with chitosan or PDDA reduced the absorption peak of the coated silica nanoparticles in a similar fashion. Peak absorption in the UV range was achieved by assembling bare silica nanoparticles layers onto layers of gold nanoparticles. Transmission color was controlled (less than 1% color distance per added bi-layer) by changing the film thickness.