

## A simple route to fabricate Au-nanoparticle patterns onto SiO<sub>2</sub> and flexible substrates: Langmuir-Schaefer and $\mu$ -contact printing techniques

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We present a simple but novel method to fabricate Au micropatterns on various substrates including SiO<sub>2</sub>, polymer, and flexible substrates via transfer of Au nanoparticles (Au-NPs) using Langmuir-Schaefer(LS) technique combined with micro-contact printing (MCP).

Au-NPs line patterns with a width from 40  $\mu$ m to sub- $\mu$ m were successfully made on the various substrates. UV-irradiation onto such formed Au-NPs patterns reduced their height. It is attributed to the UV-oxidation of thiol molecules adsorbed on Au-NPs and resultant coagulation of the Au-NPs.

The electrical conduction through the Au-NPs lines was enhanced after UV irradiation due to the coagulation of Au-NPs.

This technique can be extended to the production of multilayers of various kinds of nanoparticles with a delicate control over the properties of the individual layers. The patterned nanoparticle array has a potential applications as sensing elements in sensor arrays and as functional components in electronic devices.