

Chemistry assembly of silver nanoparticles on silicon wafer

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Abstract

To control the chemical and physical characteristic of silicon wafer, it has been grown a 4-Nitrothiophenol (4-NTP) monolayer under irradiation, then 4-NTP and bare Silicon undergo photochemistry reaction. From previous work, not only the thiol group will become S radical but also H-terminated silicon wafer turns to Si radical under UV light. We predict there may exist 4,4'-dimercaptoazobenzene (DMAB) on the modified silicon wafer surface which formed by nitro group coupling. Raman spectrum and XPS are applied to character this material, they show not only azo bond exist on the Silicon wafer but also thiol group and the Si-S bond.

In the other pervious report, they grow molecule with long carbon chain self-assemble monolayer (SAM) on Silicon wafer, it makes Silicon convert to insulator from semiconductor. In our work, we modify Ag nanoparticles by lighting to form a strong Ag-S covalent bond, make the semiconductor into a conductor. The result from XRD and SEM, we observe the Ag nanoparticles have been successfully modified on the Silicon wafer surface.

Keywords – Self-assembly monolayer, silicon wafer