

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Light reflection from semiconductor surface with submonolayer cover of metal particles IRINA BARIAKHTAR, Department of Physics, BC, USA, VALERI LOZOVSKI, TATIANA MISHAKOVA, Department of Semiconductor Electronics, KNU, Ukraine — In the framework of the Green function method, the effective susceptibility of submonolayer of metal particles covering the surface of semiconductor is calculated. The main point of calculations is taking into account the size and the shape of the particles. The particles are assumed to have the shape of the ellipsoid of revolution. The effective susceptibility was obtained in the form: $\chi_{ij}(\mathbf{k}, \omega) = [\chi_{ij}^{-1}(\omega) - nG_{ji}(\mathbf{k}, \omega)]^{-1}$, where n is the concentration of the particles, $G_{ji}(\mathbf{k}, \omega)$ is the Green function of the substrate, and $\chi_{ij}(\omega)$ is the linear response function of the single particle in the surface. Based on this, the exact form of the effective linear response function is calculated. As a result, the reflection coefficient is readily obtained via effective susceptibility and Green function. This approach allows studying the dependence of the reflection coefficient on the particle concentration and its shape, and development of the theory of ellipsometry.

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Date submitted: 21 Nov 2008

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