

DS 21: Invited Babonneau

Time: Wednesday 15:00–15:45

Location: H2

Invited Talk

DS 21.1 Wed 15:00 H2

Self-organization of noble-metal nanoparticles on rippled dielectric surfaces produced by low-energy ion erosion — ●DAVID BABONNEAU, SOPHIE CAMELIO, and LIONEL SIMONOT — Institut PPRIMME, Poitiers, France

A new route to control the morphology and the spatial organization of metallic nanoparticles, and therefore their physical properties, is to use nanostructured surfaces as templates. We will report on the development of an original approach that integrates the production of nanoripple patterns with long-range order by Xe^+ ion-etching of amorphous dielectric films (Al_2O_3 , BN, Si_3N_4) and the elaboration of organized arrays of aligned Au and Ag nanoparticles by grazing incidence ion-beam sputtering. By combining direct imaging methods (TEM, AFM)

and grazing incidence small-angle X-ray scattering (GISAXS) experiments associated with quantitative analysis, we will show that valuable information can be obtained on the morphology as well as lateral and vertical correlations of the nanostructures present in the nanocomposite films (i.e., ripples, nanoparticles, and surface roughness of the capping layer). In particular, shadowing effects due to the grazing incidence geometry lead to the formation of self-organized nanoparticles with an ellipsoidal shape and a major axis parallel to the ripples. The optical properties of the metallic nanoparticles deposited onto such unidimensional patterns of nanoripples exhibit a strong dependence on the light polarization, which can be interpreted as the consequence of both the in-plane spatial organization of the nanoparticles and their shape anisotropy.