Metallische Oberflächen – Vom Atom zum Kontakt   **Laurens Pudewill**

Abstract

Vacuum-deposited metal clusters and metallized polymers play an important role in various fields of today's technology. Hence, there is a great interest in the growth process of metal coatings on polymer surfaces. It is of prime importance to understand the growth kinetics and how the polymer influences the metal film morphology in the initial growth stage to control, vary and improve the sputter process as well as improve the surface conditions.

For in situ study of film growth GISAXS (grazing incident small-angel X-ray scattering) is a suitable tool. With GISAXS you have the ability to study the size, shape and arrangement of nanoparticles in thin films during sputter deposition. A well-collimated X-ray beam is directed to the surface and is scattered by an assembly of particles. The scattered intensity is recorded by a 2D detector. The scattered images give us detailed information about the cluster growth.

The results from the scattering data indicate a four stage process. First the nucleation stage, where impinging atoms where adsorbed and build small clusters. The second stage is dominated by the coalescence of clusters whereas the third stage is marked by coarsening. That means that the clusters do not combine anymore but adsorb new adatoms. In the last stage, the adsorptive growth proceeds only in the vertical direction.

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