

Title :

Correction of Artefacts in Atomic Force Microscopy Imaging of Thin Aluminium Films

Abstract:

Atomic force microscopy (AFM) has become a powerful tool for analysing topography and surface structures of thin films because it provides high-resolution images at nanoscale levels. Acquisition of experimental data from AFM profiling sometimes has unnecessary noise resulting to artefacts in the image. These artefacts distort the information contained in the image as they can be analysed as actual features of the micrographs if caution is not exercised. This paper illustrates the most common artefacts that occur during tapping mode AFM (TMAFM) operation and the image analysis techniques for correcting these artefacts. Using AFM images of thin aluminium films as case, flattening, bandpass filtering and fast Fourier filtering are illustrated as useful techniques for correcting the artefacts during AFM microscopy of thin coatings and surfaces. These techniques are shown to improve the morphological information of the AFM images, and the computed roughness values from the corrected images are within the range of the average values determined from the optimised AFM images in our previous study.

Keywords: thin aluminium films, atomic force microscope, artefacts, correction, fast Fourier transform