VAMAS

Surface Chemical Analysis

Technical Work Area 2

Call for Participation

Project A48

Round robin test of three-dimensional nanoscale roughness artifacts with specified statistic quantities

Objectives

This project aims to verify the quality of the roughness artifacts with specified statistic quantities designed and fabricated by focused ion beam (FIB).

Background

Surface structures are closely related to functional performance of various devices. Quantitative measurements of surface areal roughness are critical in many fields of nanotechnology. Atomic force microscopy (AFM) has long been used in surface topography measurements. However, there is currently no standardized roughness reference materials suitable for AFM. For this purpose, roughness surfaces with specified statistic quantities were designed and fabricated by FIB. The aim of this project is to test these reference materials.

Standardization Needs

Roughness is one of the important values in the field of precision mechanical engineering. However, the AFM roughness measurement procedure cannot be calibrated due to the lack of roughness standards. Through this ILC, the standardization for designing and fabricating roughness surfaces with specified statistic quantities will be established.

Work Programme

Participants will be asked to measure a sample with 12 micro/nano roughness surface patterns with specified statistic quantities. An electronic copy of the original raw data, together with a report with detailed setting parameters and other illustrations should be submitted. The original data will be used to calculate the statistic quantities of the roughness surfaces with the same procedure.

Statistical analysis of the results from participants will be conducted as consistent with ISO/TS 5725.

Deliverables and Dissemination

Results will be used to compare the S_q, S_{sk}, and S_{al20}, and to draft an ISO standard for the development of nanoscale roughness artifacts, submitted to ISO TC 201/SC9 (scanning probe microscopy) for consideration

Funding

Participants fund their own involvement in the project.

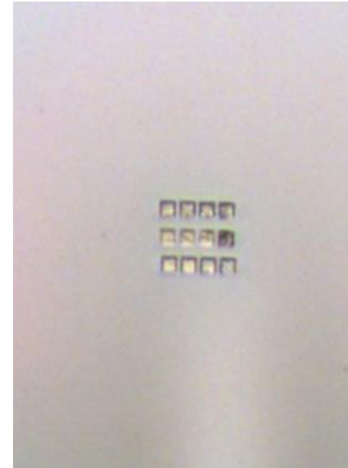

Figure 1. The optical image around the test area of the sample

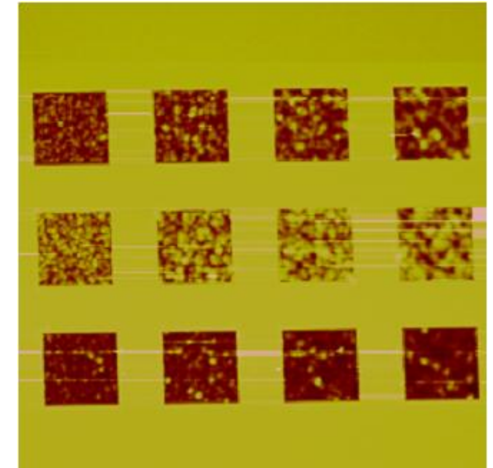

Figure 2. Full-area scan (31 µm × 31 µm) covering all the 12 surfaces.

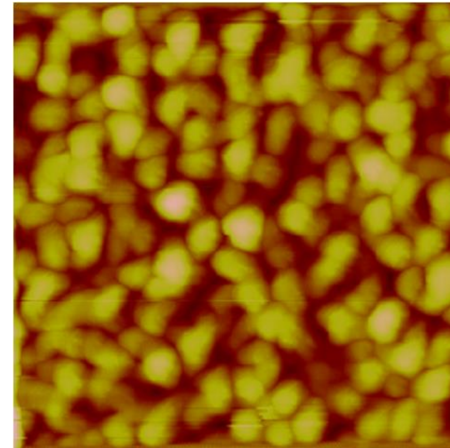

Figure. 3. A scan (5 µm × 5 µm) locating the roughness surface in the image center.

For more information:

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