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Erratum: Quantitative analysis of nanoripple and nanoparticle patterns by grazing incidence small-angle x-ray scattering 3D mapping [Phys. Rev. B **85**, 235415 (2012)]

D. Babonneau,* S. Camelio, E. Vandenhecke, S. Rousselet, M. Garel, F. Pailloux, and P. Boesecke
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After publication of this article, we discovered that the two-dimensional (2D) experimental grazing incidence small-angle x-ray scattering (GISAXS) patterns displayed in our original paper were actually reversed along the $2\theta_f$ axis. Accordingly, the low-intensity streak corresponding to the steeper slope of the ripples should be located on the positive $2\theta_f$ side in our original Figs. 6(a) and 7(a). This does not affect our methodology, and our quantitative results remain valid, except that the asymmetry factor A of the ripples is negative (and not positive as reported in our original Table I). The correct representation of the ripple shape is displayed in Fig. 1(a) of this Erratum where it appears that the as-etched Al_2O_3 and Si_3N_4 surfaces present a uniform pattern of asymmetric ripples with $\gamma_+ < \gamma_-$ so that the side facing the ion beam is steeper than the opposite side. It is worth noting that both positive¹⁻⁴ and negative⁵⁻⁷ values of A have been reported in the literature.

Moreover, taking into account the correct negative sign for δ_y in Fig. 1(b) (i.e., in the $\text{Al}_2\text{O}_3/\text{Ag}/\text{Al}_2\text{O}_3$ trilayers, the surface roughness of the capping layer replicates the buried ripple pattern with an out-of-phase modulation), we have recalculated the 2D GISAXS patterns presented in our original Figs. 11(c) and 12(c). The corrected results are displayed in Figs. 2(c) and 2(d) of this Erratum, which show a better agreement with the experimental data [Figs. 2(a) and 2(b)] than in the original paper when assuming that the surface roughness of the capping layer replicated the buried ripple pattern with an in-phase modulation. It should be noted that the simulations presented in our original Figs. 11(d) and 12(d) are not affected by the sign of δ_y , and thus, they remain valid.

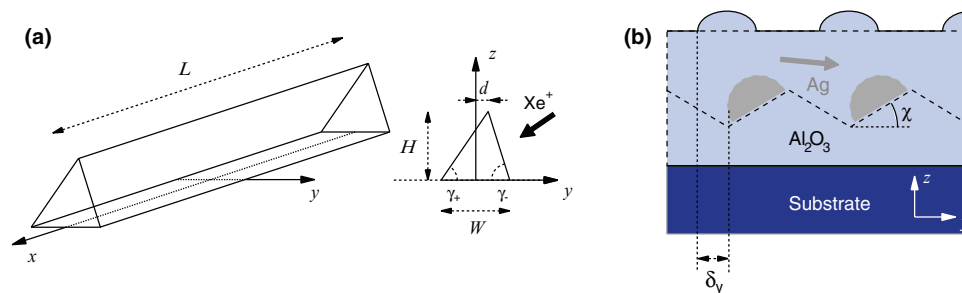


FIG. 1. (Color online) (a) Representation of the shape used to model the form factor of the ripples. The direction of the Xe^+ ion beam is also indicated. (b) Proposed sketch of the $\text{Al}_2\text{O}_3/\text{Ag}/\text{Al}_2\text{O}_3$ trilayers. The surface of the rippled buffer layer is selectively decorated by the nanoparticles on the facets that face the incoming metallic flux indicated by the gray arrow, whereas, the surface roughness of the capping layer replicates the buried ripple pattern with an out-of-phase modulation.

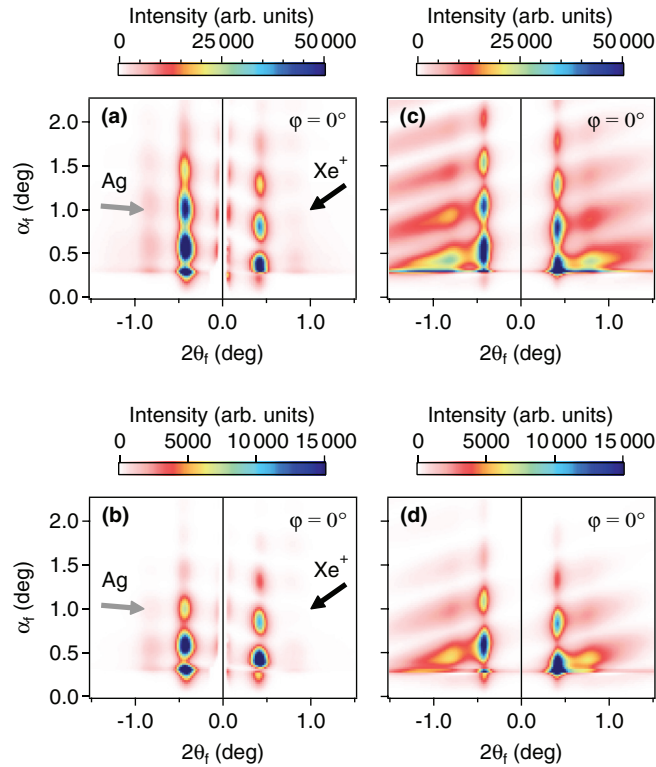


FIG. 2. (Color online) Two-dimensional experimental GISAXS patterns of Al_2O_3 -capped Ag nanoparticles grown on rippled Al_2O_3 thin films with Ag amounts of (a) 1.4 nm and (b) 2.8 nm. Corresponding 2D simulated GISAXS patterns using the configuration sketched in Fig. 1(b) are shown in (c) and (d), respectively.

*david.babonneau@univ-poitiers.fr

¹B. Ziberi, F. Frost, T. Höche, and B. Rauschenbach, *Phys. Rev. B* **72**, 235310 (2005).

²H. Zhou, Y. Wang, L. Zhou, R. L. Headrick, A. S. Özcan, Y. Wang, G. Özyaydin, K. F. Ludwig, Jr., and D. P. Siddons, *Phys. Rev. B* **75**, 155416 (2007).

³A. Biermanns, U. Pietsch, J. Grenzer, A. Hanisch, S. Facsko, G. Carbone, and T. H. Metzger, *J. Appl. Phys.* **104**, 044312 (2008).

⁴A. Metya, D. Ghose, S. A. Mollick, and A. Majumdar, *J. Appl. Phys.* **111**, 074306 (2012).

⁵G. Carter, *J. Appl. Phys.* **85**, 455 (1999).

⁶J. Völlner, B. Ziberi, F. Frost, and B. Rauschenbach, *J. Appl. Phys.* **109**, 043501 (2011).

⁷M. Ranjan and S. Facsko, *Nanotechnology* **23**, 485307 (2012).