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Simulation of Nanofilm Formation in Low-Temperature Plasmas

JAN WILLEM ABRAHAM, MICHAEL BONITZ, Institut fuer Theoretische Physik und Astrophysik, CAU Kiel — Metal-polymer nanocomposites are of growing interest in many fields because the diverse physical features of their constituents allow for the production of materials with interesting novel properties. Recent experiments [1] and simulations [2,3,4] have shown that co-evaporation of the metallic and organic components in a simple single-step process can give rise to the formation of ultrahigh-density Fe-Ni-Co nanocolumnar structures embedded in a fluoropolymer matrix. We show new results from kinetic Monte Carlo simulations that are expected to answer the question whether similar structures can also be produced in a plasma environment with an enhanced influence of surface defects.

[1] Greve et al., Appl. Phys. Lett. 88, 123103 (2006)
[2] L. Rosenthal et al., J. Appl. Phys. 144, 044305 (2013)
[3] L. Rosenthal et al., Contrib. Plasma Phys. 51, 971 (2011)
[4] Chapter in "Complex Plasmas: Scientific Challenges and Technological Opportunities," Michael Bonitz, Jose Lopez, Kurt Becker and Hauke Thomsen (Eds.), Springer Series on Atomic, Optical, and Plasma Physics, Volume 82 2014

Jan Willem Abraham
Institut fuer Theoretische Physik und Astrophysik, CAU Kiel

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