Are the porous silicon structures chaotic?

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ABSTRACT

In this work it is developed implementation of different nonlinear models that describe processes of growth and its corresponding universality class: (i) ballistic deposition; (ii) random deposition; and (iii) KPZ [1, 2]. Due to its physical properties, the KPZ 2D is adopted to simulate the structure of porous materials with spatial characteristics equivalents those finding in porous silicon samples [3]. The analisys of the modeling was done using both scaling concepts and application of the Gradient Pattern Analysis in the results gotten from the models as in the experimental AFM (Atomic Force Microscopy) images of the samples of porous silicon [4, 5]. A classification of global and local nonlinear structural patterns is considered discussing its importance for the area of complex nostructured porous materials. The growth exponent of irregular spatio-temporal structures found from the numerical simulations are presented in the dynamical process for porous silicon experimental samples generation.

References

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