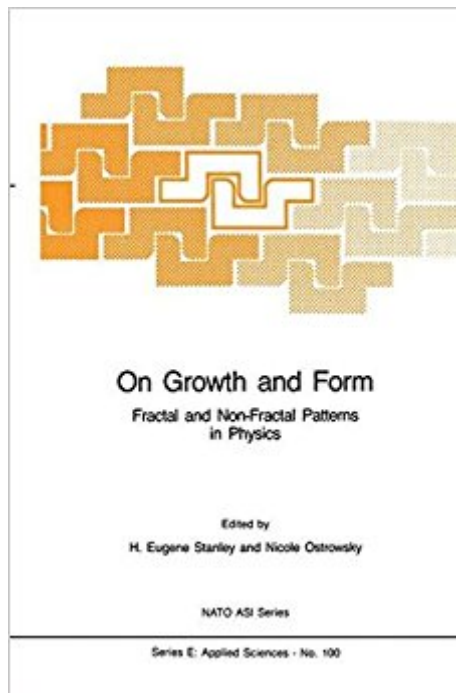


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On Growth And Form: Fractal And Non-Fractal Patterns In Physics (Nato Science Series E:)



Synopsis

We have shown that simple power-law dynamics is expected for flexible fractal objects. Although the predicted behavior is well established for linear polymers, the situation is considerably more complex for colloidal aggregates. In the latter case, the observed K -dependence of $\langle r \rangle$ can be explained either in terms of non-asymptotic hydrodynamics or in terms of weak power-law polydispersity. In the case of powders (alumina, in particular) apparent fractal behavior seen in static scattering is not found in the dynamics. 1 D. W. Schaefer, J. E. Martin, P. Wiltzius, and D. S. Cannell, Phys. Rev. Lett. 52,2371 (1984). 2 J. E. Martin and D. W. Schaefer, Phys. Rev. Lett. 5:1,2457 (1984). 3 D. W. Schaefer and C. C. Han in Dynamic Light Scattering, R. Pecora ed, Plenum, NY, 1985) p. 181. 4 P. Sen, this book. 5 J. E. Martin and B. J. Ackerson, Phys. Rev. A :11, 1180 (1985). 6 J. E. Martin, to be published. 7 D. A. Weitz, J. S. Huang, M. Y. Lin and J. Sung, Phys. Rev. Lett. 53,1657 (1984) . 8 J. E. Martin, D. W. Schaefer and A. J. Hurd, to be published; D. W. Schaefer, K. D. Keefer, J. E. Martin, and A. J. Hurd, in Physics of Finely Divided Matter, M. Daoud, Ed., Springer Verlag, NY, 1985. 9 D. W. Schaefer and A. J. Hurd, to be published. 10 J. E. Martin, J. Appl. Cryst. (to be published).

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Customer Reviews

Before perusing this series of 1985 lectures on fractals, I was not aware of the wide range of applications. The applications include dendritic crystal growth, epidemics, cellular automata, crack

propagation, polymers and colloidal systems. Of particular interest to me was the lecture by R. C. Ball of the Cavendish Laboratory on diffusion-limited aggregation, which used the formation of snowflakes as an example. I also found the discussion of scale invariant diffusive growth by T. A. Witten III of Exxon to be of interest.

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