

Physics**Investigators at Queensland University of Technology zero in on physics**

2008 NOV 24 - (VerticalNews.com) -- According to recent research published in the journal *Physical Review E*, "We present an explicit theory of the degradation and thermal fragmentation kinetics of polymerlike systems and aggregates with multiple bonds in the presence of stochastic evaporation and condensation (restoration) of bonds. The analysis is conducted on the basis of the determination of the first passage time to state zero (fragmented state) in the Ehrenfest diffusion model in continuous time." "The main approximations of the developed theory include the assumption that multiple bonds in any link between the primary elements in the aggregate do not interact with each other and that the coagulation rate after thermal fragmentation of the aggregates is negligible (which gives the absorbing zero state in the Ehrenfest model). In particular, it is demonstrated that even small condensation rates (of similar to 10 times smaller than the rates of bond evaporation) may have a significant effect on typical evolution times for the degrading aggregates and can result in a strong accumulation of nanoaggregates in the intermediate fragmentation modes. The simple asymptotic (predominantly exponential) behavior of the obtained solution at large evolution times is analyzed and discussed," wrote M.B. Flegg and colleagues, Queensland University of Technology. The researchers concluded: "The results will be important for the investigation of the degradation kinetics of a variety of polymerlike systems with multiple bonds, including self-arranged structures, polymer networks, different types of nanoclusters and their thermal fragmentation, etc." Flegg and colleagues published their study in *Physical Review E* (Ehrenfest model for condensation and evaporation processes in degrading aggregates with multiple bonds. *Physical Review E*, 2008;78(3 Part 1):1117). For additional information, contact M.B. Flegg, Queensland University of Technology, School Physics & Chemical Science, Applied Optical & Nanotechnol Program, GPO Box 2434, Brisbane, Qld 4001, Australia. The publisher's contact information for the journal *Physical Review E* is: American Physical Society, One Physics Ellipse, College Pk, MD 20740-3844, USA. Keywords: Emerging Technologies, Nanoaggregates, Nanoclusters, Nanotech, Nanotechnology, TechnologyPhysics, Queensland University of Technology. This article was prepared by News of Science editors from staff and other reports. Copyright 2008, News of Science via VerticalNews.com.

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