1050-82-9 **Jacob C Mower*** (jmower@stevens.edu), Box S-1268, Stevens Institute of Technology, 1 Castle Point on Hudson, Hoboken, NJ 07030. *Non-Existence Results for Coagulation Kinetics.*

Discrete coagulation models stochastically characterize the rate of growth and decay of particulate elements in many-bodied systems. Rates are determined by the coagulation kernel, which is specific to the simulated process. In finite time, gelation has been shown to occur for certain kernel choices, whereby macroparticles of infinite mass form. The condition for instantaneous gelation, and therefore the non-existence of solutions, has also been shown analytically for specific coagulation kernels. It is desirable to demonstrate a condition for determining the nonexistence of solutions that relies upon numerical simulations which can be readily applied to nearly all kernels. Such a method is presented, using the Smoluchowski and Dubovski discrete coagulation equations. It is shown that when a given kernel is applied to both the Dubovski and Smoluchowski models and gelation is numerically predicted to occur in the Dubovski model before it occurs in the Smoluchowski model, no solution can exist for either equation. We demonstrate the excellent agreement of our predictions with previous analytic work on nonexistence by Ball and Carr, given various choices of kernels. We finally present predictions for nonexistence using complex kernels not previously investigated for this purpose. (Received December 02, 2008)