Bicomponent aggregation with composition-dependent rates

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We consider the problem of aggregative mixing of components from a theoretical standpoint. Suppose that components A and B that are initially fully segregated in the form of primary particles are brought into contact through an aggregation process that produces clusters (aggregates, agglomerates) of primary particles. We wish to quantify the distribution of components A and B in a cluster of a given size, at a given point in time during aggregation, for the general case in which the aggregation frequencies are functions of both size and composition. The theoretical framework for the description of this problem was recently formulated [1; 2] for the special case of kernels with no compositional dependence, which we term ideal aggregation. This special case, which we term ideal mixing, may form the basis for extensions to non-ideal systems that may involve kernels that depend on the composition as well as on the size of the aggregating granules.