Some dye molecules in solution naturally aggregate, and if the aggregates are anisotropic and concentrated, they order into a liquid crystal phase. In one such dye, IR-806, different states of aggregation have different absorption peaks. At low concentration the monomer peak dominates. At a higher concentration the dimer or small aggregate peak is the largest. Finally, at an even higher concentration the peak due to large aggregates is present. A simple theory in which dimer formation is characterized by a larger equilibrium constant than larger aggregates is consistent with the data.

The kinetics of aggregation and disaggregation in the systems that form liquid crystals has not been explored. New measurements reveal that the characteristic time can range from a millisecond to many hours. In the IR-806 system, the aggregation kinetics follow a stretched exponential function almost perfectly, probably resulting from a wide range of aggregate sizes, each with a slightly different characteristic time.