

"Creating Macromolecular Arrays for Classroom Demonstrations"

The chemistry of macromolecules is becoming increasingly more important as materials science and nanoscale technology take center stage in 21st century scientific communities. Although chemistry is often referred to as the central science, it is normally taught as separate sub-disciplines. The development of novel biocompatible materials emphasizes the necessity to create more interdisciplinary and thought provoking demonstrations, which can mimic real world applications. Macromolecular matrices (MM) represent a model system. MM, as thin films, can be subjected to all types of external variables and the results monitored.

Polymers consisting of simple sugar repeat units can be used to create macromolecular arrays as a function of molecular weight. Hyaluronic acid thin films (HA) are prepared from enzymatic degradation of the high polymer. These samples on glass slides are suitable for exposure to light, magnetism, heat, various solvents, other molecules, as well as living cell.

In this presentation, however, HA is exposed to heat and/or light to produce colorful crystalline arrays that, if used appropriately, can excite students and help them conceptualize chemistry as the true central science. This approach may better prepare community college students to enter summer research programs in materials science and engineering than more traditional or focused demonstrations where outcomes are predictable.