Soluble PolyAramide Analogs: Intersections on the Research Highway

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All-aromatic polyamides (polyAramides) are the “gold standard” of the super fibers invented in 1965 at the DuPont Co. The name Kevlar is synonymous with high strength and is used as body armor. A related material, Nomex, is a boon to fire fighters, granting them precious seconds to escape from areas of intense flame. Simply described, they are nylon fibers made from aromatic diamines and aromatic diacid chlorides. Their structure makes them rigid and strong but only slightly soluble in aggressive solvents. By modifying the chemistry of the carbonyl link joining the molecules together we have synthesized materials that retain many of the desirable properties of the polyaramides but are still soluble to relatively high concentrations in simple organic solvents. Polyenaminonitriles are polymers with similar aromatic character that display a wide variety of interesting and unusual properties resulting from a relatively modest change in the structure of the aromatic nylons. This presentation will describe the rationale used in the design of this new class of polymers and report the physical properties and potential applications of these intriguing materials. In passing, the intersections of some of our minor efforts with the multilane super highway traveled by our honoree will be mapped.