Ever Expanding New World of Benzoxazines: Molecular Design for Commodity to Extreme Property Applications

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Abstract

In just a few weeks, it will be an important year, 2019, which is the Diamond Jubilee of the discovery of small molecular weight benzoxazine chemistry and the Silver Anniversary of the publication on polybenzoxazines. Polybenzoxazine is one of only a few commercialized new polymers in the past fourty years. This comes as no surprise since benzoxazine resins exhibit many properties which are seldom observed in existing polymers, such as near zero shrinkage upon polymerization, fast property development at early stage of polymerization, very high char yield, lower surface free energy than poly(tetrafluoro ethylene), and excellent electrical and mechanical properties. Most notably, extremely versatile molecular design flexibility of benzoxazine resins is second to none and tens of thousand compounds can be designed by using off-the-shelf chemicals commercially available. The lecture will introduce yet more new classes of benzoxazine subgroups that themselves offer potential for synthesizing tens of thousand compounds in addition to already very rich ability to tailor the desired properties using traditional benzoxazine chemistry.

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