Dynamic covalent polymer networks: new opportunities with old chemistry

Tao Xie ...

College of Chemical and Biological Engineering,
State Key Laboratory of Chemical Engineering
Zhejiang University, Hangzhou, P. R. China
E-mail: taoxie@zju.edu.cn

Dynamic covalent polymer networks offer unusual opportunities beyond classical thermoplastic and thermoset polymers, most notably self-healing and thermoset recycling. In the last five years, my group has been working on the use of readily accessible covalent bonds (ester, urethane, urea etc) to design functional polymer networks with dynamic characteristics. In this talk, I will illustrate how these industrially relevant covalent bonds (old chemistry) can broaden the design of functional polymer networks beyond self-healing and recycling. Specifically, I will demonstrate how the general principle of dynamic bond exchange can be applied to program a diverse set of polymer attributes including shape, actuation, stress, and physical properties. The versatility to program polymers