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During the past decades, a large number of functional polymer assemblies with various morphologies (including micelles, vesicles, rods, and disks) were prepared by solution self-assembly; these polymer assemblies showed great potential in therapeutic delivery of drug/gene substances, molecular imaging, sensors and actuators, mechanical materials, and micro/nanodevices. However, the polymer assemblies formed via noncovalent driven forces offered them dynamic features, which would result in instability under certain conditions such as dilution (low concentration), pH and ionic strength, and thermal and specific chemical stimulators; these disturbance factors may largely limit their practical applications. As a covalent approach, cross-linking technique was rapidly developed and utilized to prepare chemically fixed, stabilized, and functionalized polymer assemblies/architectures by reinforcing the interactions between the polymer units. Up to date, lots of cross-linked polymers and related cross-linking techniques have been developed for the construction of controlled release systems. Nevertheless, the innovation and utilization of high efficient, low cost, biocompatible, quantitative cross-linkers and related cross-linking strategies scales up production of the cross-linked polymer assemblies with good reproducibility, illustrating the correlation between the structure/architecture of cross-linked polymer assemblies and their controlled releasing properties, expanding the application horizon of the cross-linked polymer assemblies, and so forth, and still remains challenging. Thus, to continuously explore the challenging topics and break through the related technical bottlenecks, further research and discussion in this area are still highly deserved.

In this special issue, we would like to demonstrate the recent advances in the design, preparation, characterization, and controlled release application of the cross-linked polymer assemblies and discuss the future perspective/outlook of the related research field. Hereby, we invite researchers from worldwide to contribute their recent research papers/articles in the field of cross-linked polymer assemblies; we expect that all of the contributions will enrich the knowledge of cross-linked polymer assembly and promote the further application of these systems as advanced functional materials.

Potential topics include, but are not limited to:

- Design, preparation, and characterization technology of novel cross-linked functional polymers with controlled release properties under stimuli factors such as chemical/biochemical, thermal, light, mechanical, magnetic, electrical, and radiation factors
- New polymer cross-linking techniques used to prepare the polymer assemblies with controlled release manners, including small organic molecules as cross-linkers, polymer/macromolecular cross-linkers, special cross-linking techniques under certain physical fields (heat, light, magnetic, radiation, etc.), and bio-(enzyme) catalyzed cross-linking techniques
- Controlled release applications of cross-linked polymer assemblies in the areas such as drug/gene/biomolecules/agrochemicals/fragrant delivery, tissue engineering, functional coatings, 3D printing, antique protection, and electronic industries

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