Self-healing refers to the ability to repair itself spontaneously upon mechanical damages. It is an important survival feature in nature because it increases the lifetime of most living creatures. The self-healing feature is highly desirable for electronics and energy storage devices, which suffer from mechanical failures and short lifetime, including high-capacity energy storage and electronic skin. In this talk, Dr. Wang will present his work of using self-healing chemistry to enable high-capacity lithium ion batteries. When coated with an autonomous self-healing polymer composite, anodes made from low-cost silicon microparticles (SiMPs) (~3–8 mm), for which stable deep galvanostatic cycling was previously impossible, can now have an excellent cycle life. The design and optimization of the self-healing polymer coating will also be discussed. He will then talk about the development of next-generation self-healing polymer materials with rapid healing speed, underwater self-healing capability, etc.