

Utilization of Polyelectrolytes for Synthesizing and Assembling Nano-architectures

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Mediating the interactions between charged macromolecules and solid surfaces often enables to control the miniaturization of surface functionalities. By finely balancing hydrophilic and hydrophobic interactions, polyelectrolytes could be adsorbed on a non-charged solid surface via the layer-by-layer self-assembly process of polycations and polyanions. Based on this principle, a number of concepts have been demonstrated, which includes the macro-patterning of polyelectrolyte multilayers, the nano-patterning of polymers, and nanoparticle assemblies. Recent results also include the synthesis of transition metal oxide nano-rods with a 10 nm diameter and a 100 nm length on a surface, assisted by a polyelectrolyte. Finally, optoelectronic applications have been suggested with these architectures.