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supramolecular assemblies are a different type of large structure related to macromolecules in a supermolecular assembly parts of the structure are held together by very strong interactions but not necessarily by covalent bonds colloids liquid crystals biomolecular condensates micelles liposomes and biological membranes are examples of supramolecular assemblies and their realm of study is known as supramolecular chemistry the dimensions of supramolecular assemblies can range from nanometers to micrometers supramolecular assemblies are essential for biological function and in many aspects the field of supramolecular chemistry has been inspired by biology compelling illustrations of complex the dynamic nature of supramolecular assemblies is part of what makes them so interesting to researchers stable structures that can easily form under one set of circumstances but gently come apart under another could have lots of applications in this review we describe the recent advances in supramolecular helical assemblies formed from chiral and achiral small molecules oligomers foldamers and helical and nonhelical polymers from the viewpoints of their formations with unique chiral phenomena such as amplification of chirality during the dynamic helically assembled processes supramolecular chemistry also known as chemistry beyond the molecule focuses on the study of molecular recognition and high order assemblies formed by noncovalent interactions the supramolecular assembly process is studied for a series of oppositely charged proteins using experiments and simulations to understand the fundamental mechanisms governing assembly of supercharged proteins in this focus review based on their polygonal structures versatile functionality and host guest behavior i present various pillar n arene based supramolecular assemblies that have abstract supramolecular assembly frameworks safs represent a new category of porous materials utilizing non covalent interactions setting them apart from metal organic frameworks mofs and covalent organic frameworks cofs supramolecular chemistry specializes in non covalent interactions these weak and reversible forces are key to understanding biological processes and self assembling systems and to constructing the paradigm shift in supramolecular chemistry that we propose is the building of multicomponent systems following a multistep pathway the emergence of molecular complexity see the figure we have demonstrated a supramolecular assembly strategy for achieving halide perovskite blue and green emitters with ultrahigh plqys specifically  $18\text{c6 k } 2 \text{ hfbr } 6$  warranted a blue emission with a near unity  $96.2$  plqy and  $18\text{c6 k } 2 \text{ zrcl } 4 \text{ br } 2$  showed a green emission with a plqy of  $82.7$  a thorough introduction to supramolecular assemblies based on ionic interactions explorations of supramolecular polymers based on hydrogen bonding interactions metal to ligand interactions p electronic interactions crown ether recognition cucurbiturils and host guest chemistry of calixarenes supramolecular biomaterials afford a number of modular and generalizable platforms with tunable mechanical chemical and biological properties these include systems based on supramolecular assembly of peptides host guest macrocycles high affinity hydrogen bonding and metal ligand interactions supramolecular assemblies and interactions play a crucial role in naturally occurring biological systems dendrimer based technologies provide a platform for mimicking these naturally occurring biological assemblies to design synthetic alternatives in the field of nanomedicine after only approximately 50 years of the discipline supramolecular chemistry has been widely explored in various areas including the following

molecular machines molecular sensors gas absorption nanoreactors chemical catalysis and drug delivery this page titled 12 macromolecules and supramolecular assemblies is shared under a cc by nc 3 0 license and was authored remixed and or curated by chris schaller via source content that was edited to the style and standards of the libretexts platform a detailed edit history is available upon request supramolecular assembly appears to be an emerging theme in anti phage immune defense more and more studies have revealed that bacterial immune systems tend to form large complexes for over the last few decades many examples of supramolecular assemblies have been reported involving secondary interactions of hydrogen bonding  $\pi$  stacking charge transfer hydrophilic hydrophobic and chelation of metal cations the peptidic supramolecular assemblies which typically exhibit distances of around 3.5 Å we have observed that the  $\pi$  stacked peptides could self organize on 1d vdW crystal interfaces into highly ordered 1d assembly structures which is morphologically flat and straight distinct from the acid triggered twisted assemblies the

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