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Hybrid Materials Based on Chalcogenide Tetrahedral Clusters and Functional Organic Molecules. Pingyun Feng, Dept. of Chemistry, Univ. of California, Riverside, CA 92521.

Hybrid materials based on chalcogenide tetrahedral clusters and organic functional molecules represent an interesting class of materials that integrate the unique features from both materials. The materials can consist of single-sized tetrahedral clusters and organic ligands that act as molecular building blocks in the formation of well-ordered superlattices from zero to three dimensions. Alternatively the tetrahedral clusters can be joined directly to produce inorganic frameworks and organic molecules serves as templating agents to direct the formation of these materials. Some of these inorganic frameworks may contain organic ligands as surface capping groups. Both main-group and transition metals have been incorporated into clusters to allow the modification of structural and physical properties. Different types of organic molecules have been incorporated into the superlattice through either covalent bond, electrostatic interaction or other weaker interactions. The structural analysis based on single crystals reveals detailed information that could help the structural elucidation of larger colloidal nanostructures. The synthesis, structures, and various properties of these materials will be discussed.