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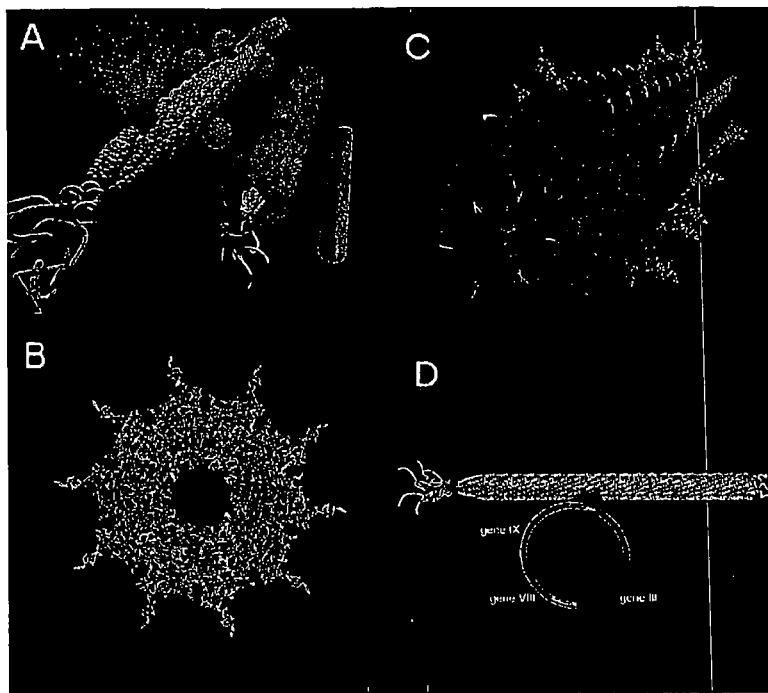
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(54) Title: INORGANIC NANOWIRES



(57) Abstract: An inorganic nanowire having an organic scaffold substantially removed from the inorganic nanowire, the inorganic nanowire consisting essentially of fused inorganic nanoparticles substantially free of the organic scaffold, and methods of making same. For example, a virus-based scaffold for the synthesis of single crystal ZnS, CdS and free-standing L10 CoPt and FePt nanowires can be used, with the means of modifying substrate specificity through standard biological methods. Peptides can be selected through an evolutionary screening process that exhibit control of composition, size, and phase during nanoparticle nucleation have been expressed on the highly ordered filamentous capsid of the M13 bacteriophage. The incorporation of specific, nucleating peptides into the generic scaffold of the M13 coat structure can provide a viable template for the directed synthesis of a variety of materials including semiconducting

and magnetic materials. Removal of the viral template via annealing can promote oriented aggregation-based crystal growth, forming individual crystalline nanowires. The unique ability to interchange substrate specific peptides into the linear self-assembled filamentous construct of the M13 virus introduces a material tunability not seen in previous synthetic routes. Therefore, this system provides a genetic tool kit for growing and organizing nanowires from various materials including semiconducting and magnetic materials.

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