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Current Directions and Prospects of Hydrogels for Biomedical Applications

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Hydrogels are versatile biomaterials that combine a high water content with tunable physical and chemical properties, making them ideal for a wide range of biomedical applications. Modern hydrogel research focuses on enhancing mechanical strength, biocompatibility, and functionality through innovative design strategies, including the incorporation of nanomaterials, self-healing capabilities, and responsiveness to external stimuli such as temperature, pH, light, or enzymes. These advancements have enabled hydrogels to support tissue engineering, drug delivery, wound healing, and other therapeutic applications more effectively than traditional single-component systems.

This Reprint highlights cutting-edge research and comprehensive reviews on the development, characterization, and application of hydrogels. It showcases recent innovations in smart and responsive hydrogel systems, nanocomposite hydrogels, and multifunctional materials that advance the performance and versatility of hydrogels in biomedical contexts.

