# Formation of Hydrogel-Based Microvalves in Microfluidic System

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Hydrogel-based microfluidic platform has been extensively investigated because it is easy to position at microfluidic system by photo-polymerization and can perform both sensing and actuation functions. There are several types of hydrogels according to actuating methods, such as pH, temperature, metal ion and so on. Here we propose novel nanofluidic concentrator system which is prepared by combining pH sensitive hydrogel microvalve with patterned colloidal crystals. To integrate the colloidal crystals on microfluidic chip, colloidal particles are crystallized on photocurable polymer thin film first. By using conventional photolithographic method, the colloidal crystals were patterned in micron scale then incorporated into microfluidic channel. Hydrogel valves with various shapes could be fabricated by in situ photopolymerization in microfluidic channel. The concentrator system was actuated and tested with pH buffer solution to give nanoscale sieve for concentrate the nanosclae analytes. Finally, hydrogel-based microfluidic concentrator system was applied to concentrate the metal nanoparticles.