

Dual Stimuli -responsive Membrane for Multiple Nano Valves

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Stimuli -responsive polymers have been widely used for the controlled drug release. However, in the majority of cases, only a single stimulus, for instance, temperature, pH, and light, is employed. Although some stimuli could be applied together, each stimulus could not be independently employed. Once one can independently control the drug release utilizing two (or more) stimuli, the concept of multiple on -off gates is realized. Here, we introduced dual stimuli -responsive controlled release system. For this purpose, the top and the bottom parts of anodized aluminum oxide membrane walls are independently grafted by thermo -responsive polymer of poly(N -isopropylacrylamide) and pH -responsive polymer of poly(acrylic acid), respectively, by using atom transfer radical polymerization. Temperature and pH -dependent flux test was investigated and the concept of multiple on -off gates is shown.