Title: Poly (N-Isopropylacrylamide) Hydrogel Networks and Sieving Characteristics

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Abstract: The three-dimensional of hydrogel networks within nm range can microscopically be considered as "porous"mesh. This feature may imply that hydrogel networks possess sieving characteristics; i.e. exclusion of solutes or molecules based on size. In this study the network and sieving characteristics of poly(N-isopropylacrylamide) (PNIPAAm) hydrogels were investigated. PNIPAAm hydrogels were prepared via free radical using N-isopropylacrylamide (NIPAAm) as main monomers and N,N'-methylenebisacrylamide (MBAAm) as crosslinkers. As the composition of the hydrogels was varied, the mesh sizes of the resulting hydrogels were in the range of 4.0 to 11.0 nm. These data were obtained from swelling experiments. Dextrans as test solutes with molecular weight in the range of 4 to 2000 kg/mol were used in partitioning experiments to investigate the sieving of the hydrogel networks. The partitioning data indicated that of hydrogel networks excluded the solutes which were bigger than its mesh sizes. The experimental results not only show a good correlation of sieving coefficient on the size basis but also nicely fitted to the partition data estimated from the Ogston model. Undoubtedly, PNIPAAm hydrogel networks possessed sieving characteristics to separate molecules exclusively and selectively as a function of size.