

Chitosan-based interpenetrating polymer network hydrogels



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The recent developments in polymeric science have led to many novel drug delivery systems. One of them are interpenetrating polymer networks (IPN) based on chitosan and PAA as bioactive materials for the pharmaceutical industry. A synergistic effect can be produced using IPN technology by formulating an IPN between a natural and synthetic polymer, hence combining the properties of both polymers. Each network retains its individual properties so that synergistic improvements in properties like strength or toughness can be seen. In the present study, we have synthesized copolymer of acrylamide and chitosan with ceric ammonium nitrate as a redox system.

These IPNs possess excellent properties because of their improved biocompatibility and good swelling properties

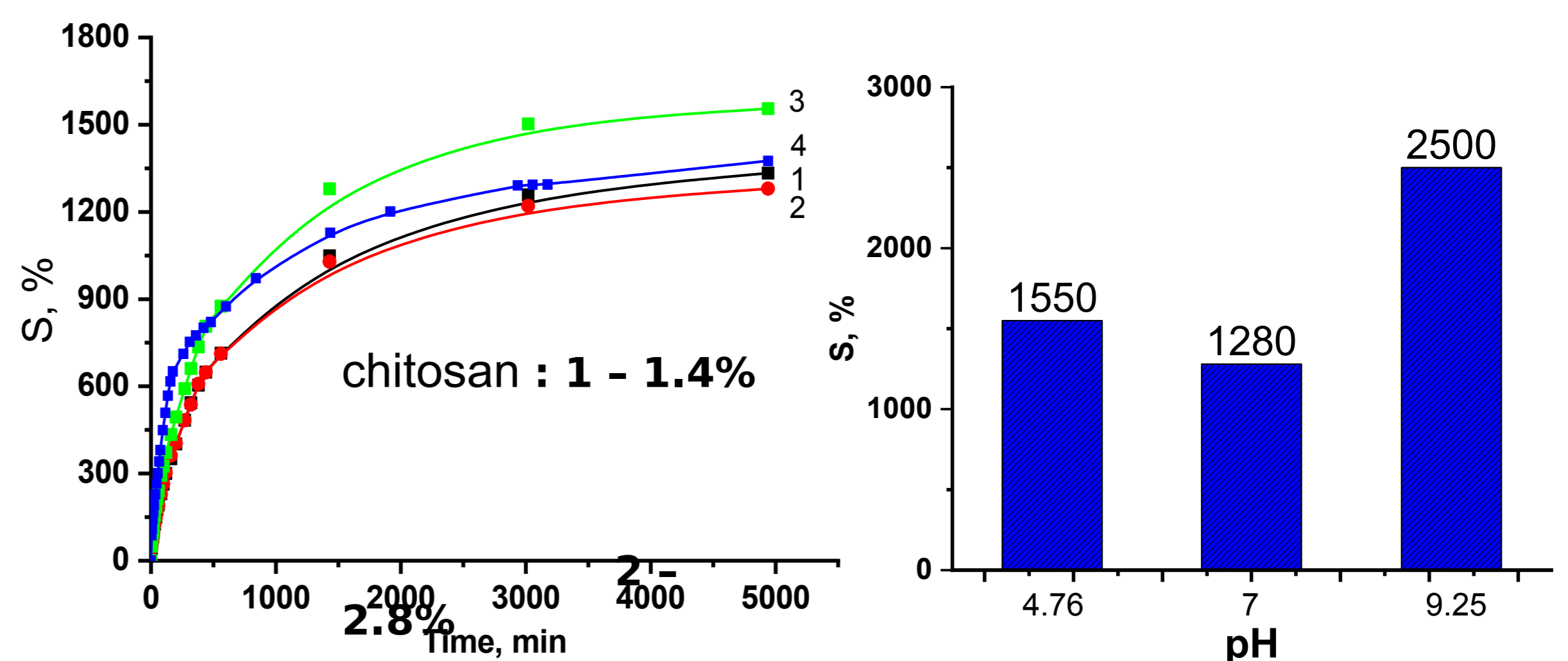


Figure 2. IPN-hydrogel swelling behavior

5.56%

Coupled with the elevated thermostability of both polymers this may point to their strong interaction or grafted structure

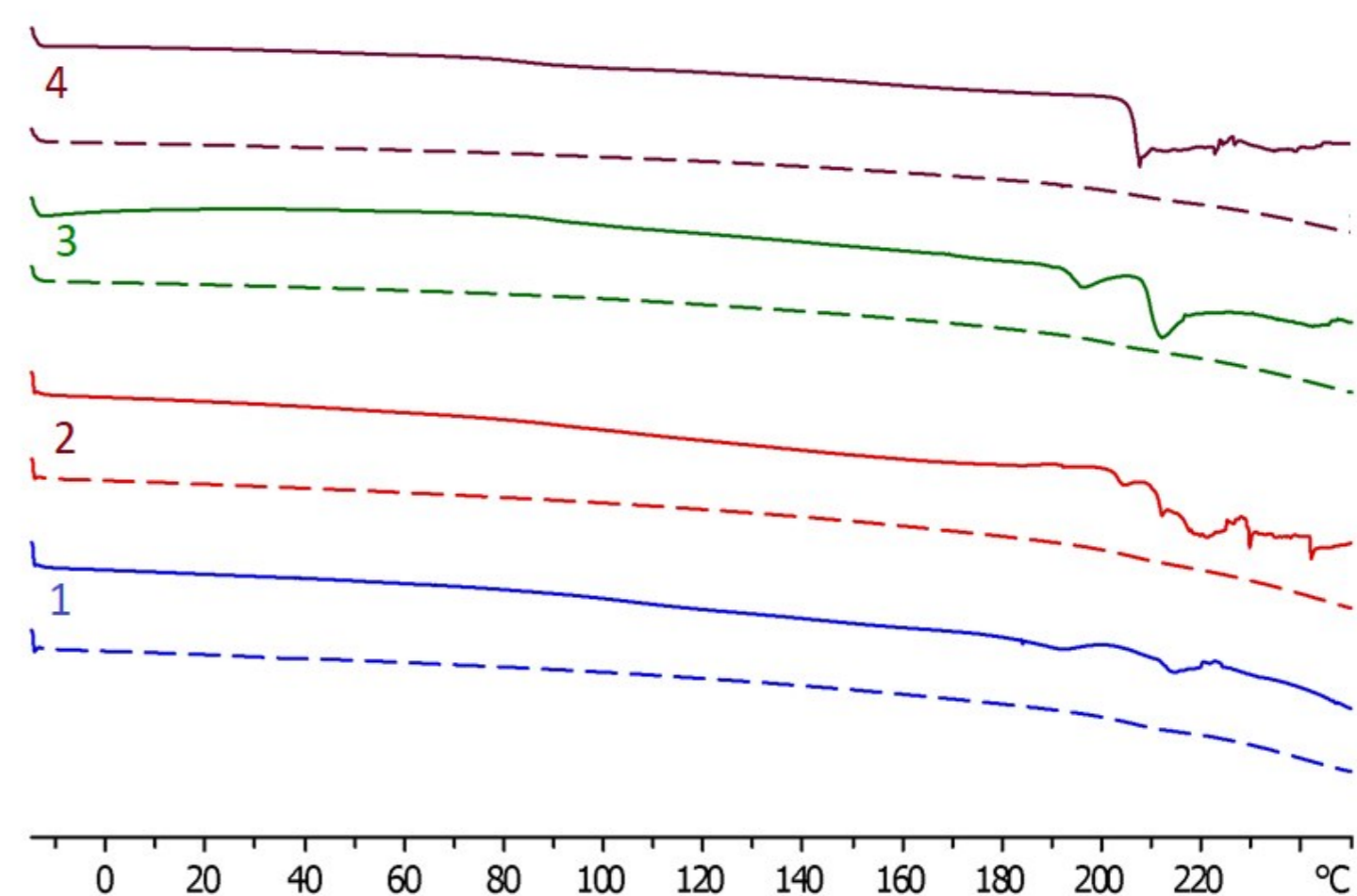


Figure 3. Normalized DSC profiles of the dried hydrogel samples (heating): 1st scan (solid lines) and 2nd scan (dotted lines). 1– PAA, 2 – Ch-PAA-1.43, 3 – Ch-PAA-2.86, 4 – Ch-PAA-5.71

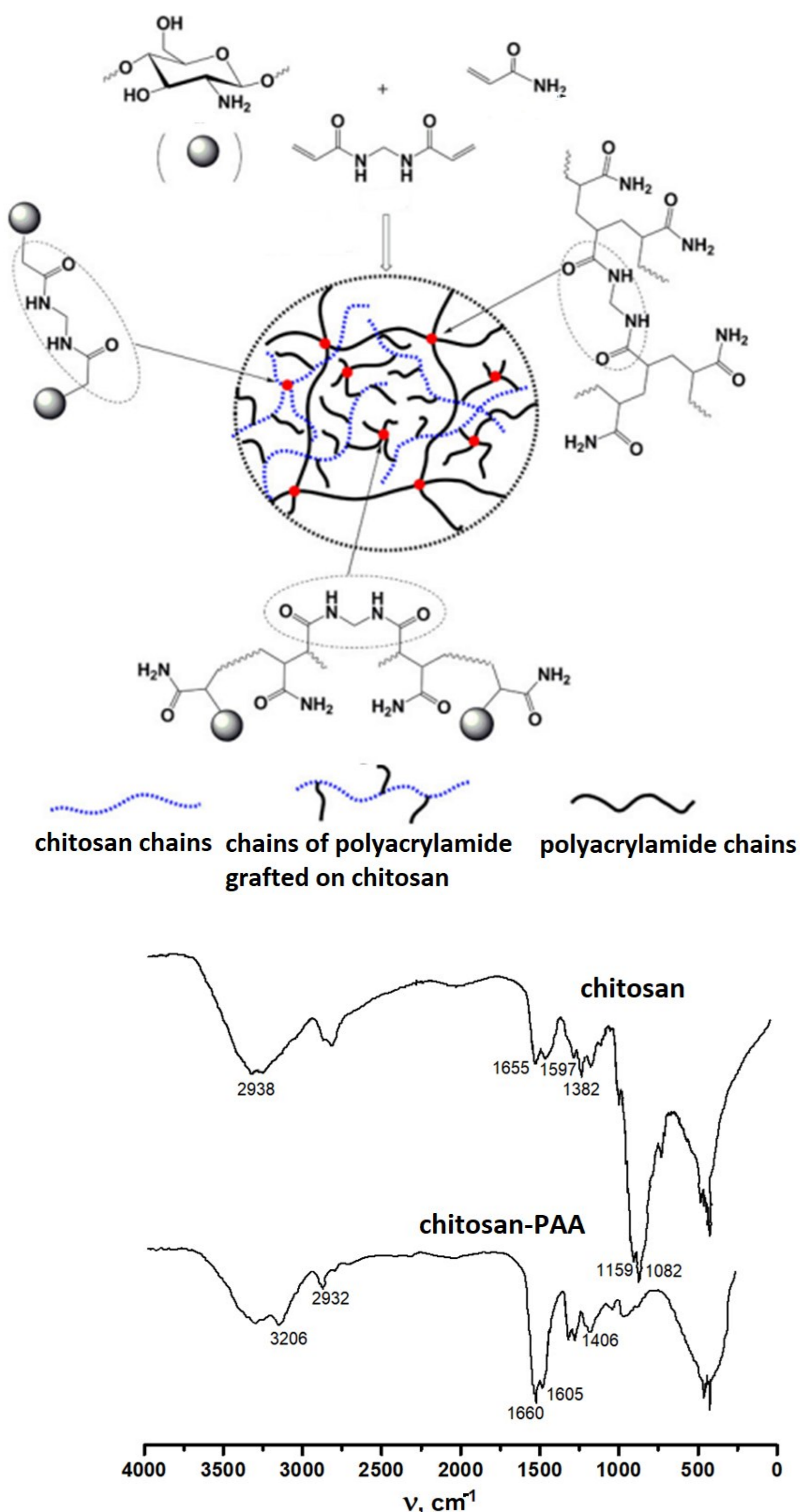


Figure 1. FTIR-spectra of IPN-hydrogels

Conclusions. Chitosan addition to polyacrylamide gel results in an increase in the total water content in the samples accompanied by a decrease in the fraction of bound water, which reflects partial dehydration of polyacrylamide. Coupled with the elevated thermostability of both polymers this may point to their strong interaction or grafted structure.