

Synthesis and solution properties of a new sulfobetaine/sulfur dioxide copolymer and its use in aqueous two-phase polymer systems

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ABSTRACT

The zwitterionic monomer, 3-(N,N-diallylammonio)propanesulfonate, was copolymerized with sulfur dioxide in DMSO using azobisisobutyronitrile (AIBN) to afford the polysulfobetaine (PSB) copolymer in excellent yields. The PSB was converted into the corresponding anionic polyelectrolyte (APE) by treatment with 1 equiv. of sodium hydroxide. The solution properties of PSB and APE were investigated by potentiometric and viscometric techniques. The critical (min.) salt concentration (CSC) required to promote water solubility for the PSB at 23 °C were measured. The basicity constant of the amine functionality in APE was found to be 'apparent' and as such follows the modified Henderson-Hasselbalch equation. The composition and phase diagram of the aqueous two-phase polymer systems of PSB (treated with 0.60 equiv. sodium hydroxide) and polyethylene glycol (PEG) in 0.1N KCl was studied for the first time for this class of PSB copolymer.