



## Poly(phthalazinone ether sulfone ketone) properties and their effect on the membrane morphology and performance

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### ABSTRACT

Poly(phthalazinone ether sulfone ketone) (PPESK) copolymer is a relatively newly developed material, which contains different component ratios of diphenyl ketone and diphenyl sulfone with respect to a certain amount of 4-(4-hydroxyphenyl)-2,3-phthalazin-1-one. In this study, the physico-chemical characteristics of this copolymer, including the glass transition temperature, the intrinsic viscosity, the DSC (differential scanning calorimeter) and FT-IR spectra have been investigated. The chemical stability of this copolymer has been tested with several commonly used acids, bases and oxidants. The apparent viscosity of this copolymer dissolved in N-methyl pyrrolidone (NMP) solvent at different concentrations and temperatures has been measured. The effect of two additives, polyethylene glycol (1000 g mol<sup>-1</sup>) and Tween80, on the apparent viscosity of the PPESK/NMP solution, has been investigated. Further, the PPESK/NMP solution has been used to prepare asymmetric ultrafiltration membranes, and the influence of the solution viscosity on the gelation rate, the membrane structure and the ultrafiltration performance has been studied. The results present here provide fundamental data on this promising copolymer material, and will be beneficial for its future application, especially in the membrane formation area.

*Keywords:* Poly(phthalazinone ether sulfone ketone); Ultrafiltration; Chemical stability; Rheological property; Gelation

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