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Effects of boric acid on the phase stability of poly(1-oxotrimethylene) solutions in the aqueous solution of ZnCl₂, CaCl₂, and LiClDae Eon Jung¹, Han Beol Jang¹, Eun Jeoung Lee¹, Dong Wook Chae² and Byoung Chul Kim¹¹Hanyang University, Republic of Korea²Kyungpook National University, Republic of Korea

The effects of boric acid on the phase change of poly(1-oxotrimethylene) (ECO) solutions in the aqueous solution of ZnCl₂, CaCl₂, and LiCl were investigated in terms of aging time and temperature. The aging of ECO solutions at 70°C resulted in the increase of the dynamic viscosity (η') and the decrease of loss tangent ($\tan\delta$), indicating the gelation of the solutions. By the addition of 1 wt% of boric acid, however, such gelation behavior was significantly retarded, giving rise to the negligible change of rheological properties with aging time at least up to 8 hrs. It was ascribed to the enhanced solubility of ECO in the presence of boric acid, more tolerable to thermal fluctuations, which was supported by the results of intrinsic viscosity and pH value. Further, the $\tan\delta$ value and the slope of the Cole-Cole plot of the solutions were increased with increasing boric acid up to 1 wt%, followed by the decrease above that content, indicating that the homogeneity of the solutions was maximized at the 1 wt% of boric acid. Boric acid influenced on the metal-ligand complex of Zn cations and water molecules and thus led to the easier dissociation of protons from water molecules, which was favorable for the protonation on the carbonyl group of ECO molecules. In UV-Vis spectra, the absorbance at 390 nm representing the generation of complexes between Zn cations increased with aging time at 70°C whereas the absorbance almost disappeared by the addition of boric acid.

Biography

Dae Eon Jung is presently associated with Department of Organic and Nano Engineering, Hanyang University, Japan. He has published numerous research papers and articles in reputed journals and has various other achievements in the related studies. He has extended his valuable service towards the scientific community with his extensive research work.

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