

## Abstract

The alkaline phosphatase catalyzed hydrolysis of disodium-p-nitrophenyl phosphate was studied in four model systems comprising sucrose, maltodextrin, carboxymethylcellulose (CMC), and CMC-lactose in a temperature range of -28 to 20 degrees C. In the maltodextrin and CMC-lactose model systems, the reaction rate decreased to a very low value as the glass transition temperature was approached. In the CMC and CMC-lactose systems with low initial solute concentration, as a consequence of freeze-concentration, a rate maximum around the initial freezing temperature was observed. The Arrhenius equation described the temperature dependence of the reaction rate both in the liquid and the glassy states in all systems studied, while a slightly curved Arrhenius plot was observed in the "rubbery" state of the CMC and CMC-lactose systems. The WLF equation with system-dependent coefficients described the kinetics in the rubbery state of all the model systems except sucrose, excluding the short temperature range where reaction rate enhancement with decreasing temperature was observed.