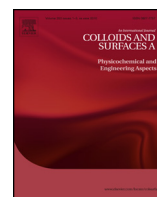




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A novel supramolecular catalytic system based on amphiphilic triphenylphosphonium bromide for the hydrolysis of phosphorus acid esters

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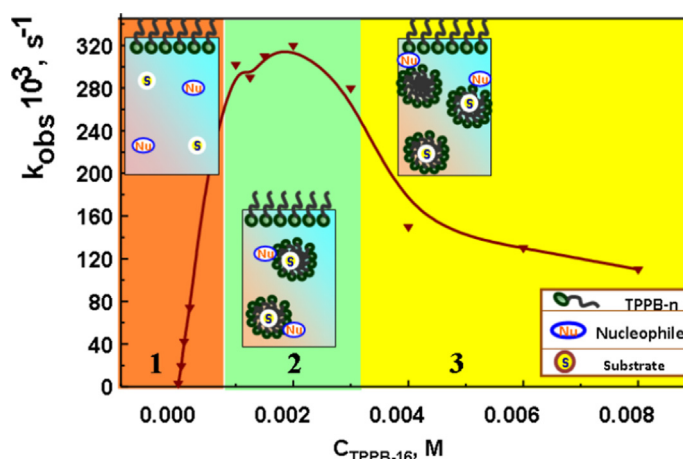
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HIGHLIGHTS

- Alkyltriphenylphosphonium bromides form micelles with higher solubilizing capacity.
- The acceleration of the reaction (more than two orders of magnitude) was observed.
- Catalysis is due to the concentration of the reagents in micellar pseudophase.

GRAPHICAL ABSTRACT



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ABSTRACT

The biomimetic nature of micellar catalysis can significantly affect the rate of chemical reactions due to the effects of concentration and the change of microenvironment. Here, a key role is played by the nature of the head group. The catalytic activity of alkyltriphenylphosphonium bromides (TPPB-*n*; *n* = 10, 12, 14, 16, 18; *n* is the number of carbon atoms in alkyl groups) in the nucleophilic substitution of *p*-nitrophenyl esters of alkylchloromethylphosphonic acid were investigated by the method of spectrophotometry. Using pyrene, prodan and Sudan I as probes the values of critical micelle concentrations and aggregation numbers were determined. A comparison of the results of kinetic dependence processing by Berezin equation obtained for TPPB series with the known ammonium analogues was carried out. It was found that for TPPB-*n* series, the higher acceleration of reaction has been achieved due to concentration factor compared to ammonium surfactants. This agrees with the fact that alkyltriphenylphosphonium bromides demonstrate higher aggregation activity forming micelles with higher solubilizing capacity.

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