

## Synthesis of Supramolecular Phosphatases Functionalized with Lewis Acid Moieties for Catalytic Hydrolysis of Phosphate Monoester in Two-Phase Solvent System

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The phosphorylation and dephosphorylation of proteins are essential regulatory systems that can significantly alter the structures, subcellular localization, stability and biological activity of proteins and related biomolecules. Although some artificial compounds which mimic the active center of metallophosphatases have been reported, very few of them function as catalysts for the hydrolysis of phosphate monoesters such as mono(4-nitrophenyl) phosphate (MNP), because phosphate monoesters are generally less reactive than phosphate diesters and triesters.

A supramolecular strategy based on the self-assembly of molecular building blocks represents a potentially useful strategy for the construction of artificial chemical architectures that exhibit higher and more specific chemical reactivity.<sup>1)</sup> We previously reported the supramolecular complexes formed by the 2:2:2 self-assembly of bis(Zn<sup>2+</sup>-cyclen) complexes (cyclen = 1,4,7,10-terazacyclododecane) having a 2,2'-bipyridyl (bpy) linker and one or two long alkyl (C<sub>22</sub>) chains (Zn<sub>2</sub>L<sup>2</sup> and Zn<sub>2</sub>L<sup>3</sup>, respectively), with the functionalized barbitol (Bar) derivatives and Cu<sup>2+</sup> in two-phase solvent system (CHCl<sub>3</sub>/H<sub>2</sub>O) accelerate the hydrolysis of MNP.<sup>2-4</sup> In this paper, we report new supramolecular complexes formed by the 2:2:2:4 self-assembly of Zn<sub>2</sub>L<sup>2</sup>, Bar-18-crown-6 ether conjugate, Cu<sup>2+</sup> and alkaline metal, that have a higher MNP hydrolysis activity in the presence of K<sup>+</sup> than that in the presence of Li<sup>+</sup>, Na<sup>+</sup>, Rb<sup>+</sup>, and Mg<sup>2+</sup>.<sup>5)</sup>

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