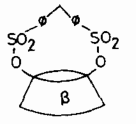
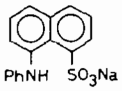
is as following by our thermodynamic consideration [1]; (*a*) destruction of water cluster originally developed along the surface of the guest molecule in water, (*b*) van der Waals interaction between the guest surface and the interior surface of guest molecule, (*c*) stabilization of water molecule(s) originally bound in the cavity. Capped cyclodextrin (I) thus shows the remarkably enhanced van der Waals stabilization, leading to very strong binding as shown by equilibrium constants.



I



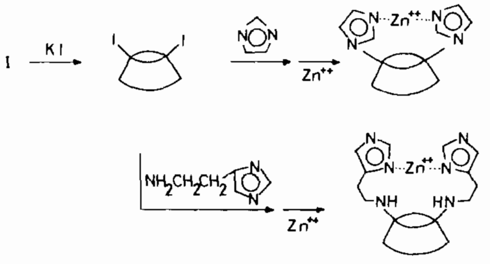
II

$$I + II \overset{H_2O}{\rightleftharpoons} I{\cdot}II; \qquad K = 1{,}300\, M^{-1}$$

$$\beta\text{-CD} + II \overset{H_2O}{\rightleftharpoons} \beta\text{-CD}{\cdot}II; \qquad K = 53\, M^{-1}$$

Therefore, strong hydrophobic nature of the capped cavity is evident [2, 3].

Carbonic anhydrase activity is said to require CO_2 and H_2O in hydrophobic environment around (imidazole)$_3$Zn^{++}. This situation is reasonably modeled by IIIa or IIIb,



IIIa

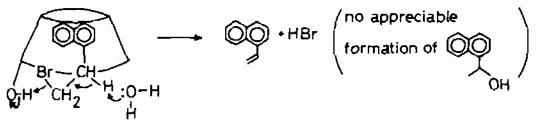
IIIb

$$H_2O + CO_2 \rightleftharpoons HCO_3^- + H^+$$

where H_2O solute seems to be strongly activated by Zn^{++} coordination and the hydrophobic environment as is seen from the catalytic constants.

	k_{cat} (M^{-1} sec^{-1})
imidazole	negligible
(imidazole)$_2$Zn^{++}	2.0
IIIa	16.2
(histamine)$_2$Zn^{++}	57.9
IIIb	166

When a water (solute) molecule appropriately approaches the 'rim' (edge) of the cavity, it is so activated as to promote efficient hydrolysis, as is seen in the example below.



References

1 I. Tabushi *et al.*, *J. Am. Chem. Soc.*, *100*, 916 (1978).
2 I. Tabushi *et al.*, *J. Am. Chem. Soc.*, *98*, 7855 (1976).
3 I. Tabushi *et al.*, *Tetrahedron Lett.*, 2503 (1977).

The Structure of Water in the Double Layer

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The origin of the concepts of water contributing a structure to the double layer is traced from the first equation involving a surface potential to Klein and Lange, through the first model suggestions of Bockris and Potter in 1952 to the more recent aspects of the situation as indicated by the optical spectroscopy of Bewich.

The models of water in the double layer are concerned with solvent–solvent and solvent–solute interactions, and are of relevance in interpreting major aspects of double layer phenomena.

The introduction of water into the double layer structure and basic equations which connect such structure with other properties of the double layer (Bockris, Devanathan and Mueller, 1963) contributed a fourth stage (after the classical ones of Helmholtz, Gouy and Stern) to ideas of double layer structure.

A presentation of current models and suggestions for future developments is given.

Copper(II) Chelate Complexes – Solute and/or Solvent Interactions

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Some problems of the specific interactions between copper(II) chelate complexes, and Lewis bases and/or acids added to the 'inert' solvents or