INVESTIGATION OF CALMODULIN (CaM) BY MEANS OF SELF-ASSEMBLED MEMBRANE USING ELECTROCHEMICLA IMPEDANCE SPECTROSCOPY (EIS) METHOD

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The purpose of this paper is to present the electrochemical behavior of Calmodulin (CaM) self-assembled on Au substrate under different pH value and its combination with Ca^{2+} systematically for the first time, where the redox couple of $Fe(CN)_6^{3-}/Fe(CN)_6^{4-}$ was employed as the probing-pin.

The importance of Calmodulin (CaM) has been confirmed by the former report[1]. Meanwhile, due to the ability of creating well-organized monolayer, the self-assembled technique was used in this paper.[2]

Since it is difficult to probe the properties of CaM in its real environment, the NaCl solution containing $Fe(CN)_6^{3-}/Fe(CN)_6^{4-}$ was used as its environment.

The fact that the active of CaM relates with its pH environment intimately has been testified[1]. Hence, it is very important to probe the effect of pH value on CaM. The electrochemical response of CaM in different pH value was shown in figure 1. From it, we can see that the charge transfer resistance(R) of $Fe(CN)_6^{3-}/Fe(CN)_6^{4-}$ varies with pH value regularly. It is well known that the bigger R corresponds the more packed structure of the membrane. Interestingly, the most packed structure this membrane appears at the CaM's isoelectric point, which is consistent with the former report[1] very well.

Obviously, the combination of CaM with Ca^{2+} is another interesting problem in its research field. Here, the combination of CaM with Ca^{2+} was accomplished by introducing Ca^{2+} (in the form of $CaCl_2$) into the measuring system. The capacitance element Q, which was also obtained from EIS measurement, was used to detect the electrochemical response of this membrane under different concentration of Ca^{2+}, unexpectedly, the relation between Q and Ca^{2+} concentration was well illustrated in figure2, where the concentration region agreed with the former report[3] exactly.

One latest way to probe CaM was developed is the main contribution of this paper.

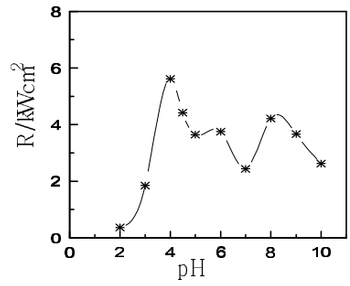

Fig1 The relationship between the charge transfer resistance R and pH value

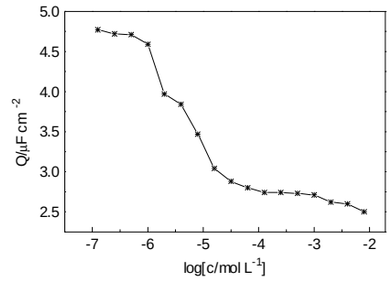

Fig 2 The relationship between the concentration of Ca^{2+} and the capacitance element Q

References:

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