

具有不同取代链长的卟啉衍生物LB膜的结构研究

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摘要

本文研究了三种羧酸取代的四苯基卟啉衍生物在空气/Cd<sup>2+</sup>水溶液界面上所形成的单层膜及LB膜。这三种卟啉衍生物中,一种没有脂链,另外两种具有不同长度的脂链。由 $\pi$ -A等温线得到的平均表观分子面积相差很大。紫外-可见光谱表明,

LB膜中卟啉的Soret吸收带相对于溶液的吸收均红移,但红移程度不同。LB膜的偏振紫外-可见光谱表明,

LB膜中三种卟啉衍生物的卟啉环具有基本一致的取向。运用亚相降低法得到了三种卟啉衍生物单层LB膜,其紫外-

可见光谱与用垂直提拉法得到的LB膜的紫外-可见光谱具有一致的特征。这些结果表明:

卟啉衍生物有无取代链及取代链长的不同对平均表观分子面积的大小和膜中环间的距离有影响,

但对环的取向没有影响。环的取向由环本身及环上的亲水取代基来确定。气/

液界面上三种卟啉衍生物的单层膜中环也具有一致的取向,

且与LB膜中环的取向相差不大。提拉不会对膜中环的取向及膜的结构造成大的改变。

关键词 [分子结构](#) [取向](#) [卟啉](#) [L-B膜](#)

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## Studies on the structure of LB films of porphyrin derivatives containing different substituted alkyl chains

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**Abstract** Monolayers and LB films of three kinds of carboxylic acid substituted porphyrins without alkyl chain or with alkyl chains of different length have been studied in this paper. Mean molecular areas were measured and found to increase as the alkyl chain length increased. UV-Vis spectra show that soret absorption bands of porphyrins in LB films have different red-shift compared with solution spectra. The polarized UV-Vis spectra show that the three kinds of porphyrins have the same orientation in LB films. The LB monolayers were obtained by using subphase lowering method, their UV-Vis spectra show the same characteristics as those in LB films obtained by using vertical dipping method. These results indicate that substituted alkyl chains have great influence on mean molecular areas and the distance between porphyrin rings in monolayers or LB films, but have no influence on porphyrin ring orientation. The porphyrin ring orientation is determined by porphyrin and the substituted hydrophilic groups. The three kinds of porphyrins have the same orientation in monolayers at Cd<sup>2+</sup> aqueous solution interface, too, and the orientation preserved during the transfer.

**Key words** [MOLECULAR STRUCTURE](#) [ORIENTATION](#) [PORPHYRIN](#) [L-B MEMBRANE](#)

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