

稀土离子及其配合物对二棕榈酰磷脂酰乙醇胺相变性质的影响

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摘要 用差示扫描量热研究了金属离子和稀土配合物对二棕榈酰磷脂酰乙醇胺(DPPE)

脂双层由凝胶态向液晶态相转变的影响T~m的影响。发现加入金属离子提高了DPPE脂双层的相转变温度。其中,

Na⁺<Ca²⁺<Ln³⁺。Pr³⁺的影响较La³⁺强。在pH 7.4时,柠檬酸镧对T~m影响很小,相反在pH 2.0时,

降低相变温度T~m。乳酸稀土在pH 2.0和pH 7.4时都显著提高T~m,在中性条件下,对T~m影响更大。同时,

乳酸稀土较相同浓度下的稀土离子影响大,

说明乳酸稀土中稀土离子和乳酸根配体存在协同作用。我们初步探讨了金属离子以及稀土配合物对DPPE脂双层相变温度影响的原因。

关键词 [相变](#) [稀土金属络合物](#) [示差扫描量热法](#) [金属离子](#) [协同作用](#) [国家攀登计划基金](#) [二棕榈酰磷脂酰乙醇胺](#)

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The effects of lanthanide ions and their complexes on the phase transition property of dipalmitoylphosphatidylethanolamine liposomes

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Abstract The effects of metal ions and lanthanide complexes on the gel-to-liquid crystal phase transition temperature T~m of dipalmitoylphosphatidylethanolamine liposomes have been studied by differential scanning calorimetry (DSC) method. The results show that the addition of metal ions to the dipalmitoylphosphatidylethanolamine (DPPE) liposomes dispersions increases the main phase transition temperature T~m in the order of monovalent<divalent<trivalent cations. The enhancement of T~m is not large as increasing the lanthanide ions concentration. The enhancement of Pr³⁺ is larger than that of La³⁺. Remarkable differences were observed between La-citrate and La-lactate complexes at different pH solutions. At pH 7.0, La-citrate complex has no effect on the T~m, La-lactate complex, however, increases the T~m value, and the increase is larger than that of free lanthanide ions at the same concentration. The decrease of pH of complexes solutions lowers the phase transition temperature. We have preliminarily discussed the mechanism of the enhancements of lanthanide ions and the synergism of lanthanide ion and lactate ligand follow the ion induced dehydration of lipid and the potential effects of ion-lipid interaction.

Key words [PHASE TRANSFORMATION](#) [RARE EARTH METAL COMPLEX](#) [DIFFERENTIAL SCANNING CALORIMETRY](#) [METAL ION](#)

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