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# 水溶液中的氨基酸桥联环糊精二聚体的分子识别

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摘要 采用荧光偏光方法研究了用2-氨基-L-1，5-戊二酸衍生物和(1R,3R)-1-氨基-1，3-二羧基环戊烷衍生物桥联的环糊精二聚体1和2(主体)，在298K、pH=7.4时，与四个低分子量的多肽(客体，H-Trp-Trp-Arg-Arg-NH23；Adm-Trp-Arg-Arg-NH24;Adm-D-Trp-Arg-Arg-NH25;H-Trp-Trp-Trp-Trp-Arg-Arg-NH26)之间的相互作用。研究结果表明，二聚体环糊精对于多肽的分子识别作用，就主体而言，即便是主体作用位点以外部分基团结构的改变，对主-客体之间的分子识别也有重要影响，并且两个空腔在组装客体过程中相互之间产生协同作用，就客体而言，多肽分子的链长、疏水性及其嵌入基团的极性、大小、形状等对包合物的形成与稳定均起重要作用。主-客体组装过程中产生负的焓变和正的熵变，表明范德华-伦敦色散力、氢键和疏水相互作用是本文研究体系的主要包合驱动力。

关键词 荧光偏光分析 氨基酸 环糊精 二聚体 分子识别 多肽 包合物

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## Molecular recognition of double cyclodextrin bridged with amino acid derivatives in aqueous solution

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**Abstract** The interaction between four peptides with low molecular weight (guest, H-Trp-Trp-Arg-Arg-NH2 3; Adm-Trp-Arg-Arg-NH24; Adm-D-Trp-Arg- Arg-NH25; H-Trp-Trp-Trp-Trp-Arg-Arg-NH26) and cyclodextrin dimers (host, 1,2) bridged with derivatives of glutamic acid or (1R, 3R)-1- aminocyclopentane-cis-1,3-dicarboxylic acid was investigated by using fluorescencepolarization method in aqueous buffer solution (pH 7.4) at 298 K. It was shown that the molecular recognition of a double cyclodextrin to a peptide is not only affected by the structure and properties of the bridging group between two cyclodextrins but also related to the chain length, hydrophobicity of a peptide and polarity, size and shape of the penetrating group. The changes in enthalpy (△ H^0) and entropy (T△S^0) accompanying the complexation were determined in usual way. It was found that complexation is accompanied by negative changes in enthalpy and positive changes in entropy, indicating that van der Waals-Lodon dispersion, hydrogen bonding and hydrophobic interaction between a double cyclodextrin and a peptide are mainly responsiblefor the inclusion compound formation.

**Key words** AMINO ACID CYCLODEXTRIN DIMER OLECULAR RECOGNITION POLYPEPTIDE CLATHRATES

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