

材料化学工程与纳米技术

## 基于香豆胶的疏水改性阴离子聚电解质溶液性能

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摘要

将十二烷基 (Dod) 与十六烷基 (Cet) 以酯键方式分别引入经羧甲基化改性的香豆胶大分子骨架上, 制备了基于香豆胶的疏水改性阴离子聚电解质衍生物 (HmCmFG)。通过荧光探针芘的激发光谱、发射光谱以及紫外光谱研究了 HmCmFG 溶液中的疏水缔合行为, 研究发现, 此疏水缔合行为受到 HmCmFG 大分子上烷基链长与取代度以及溶液中低分子电解质 NaCl 的显著影响, 增加烷基链长、提高烷基取代度或增大 NaCl 浓度均有利于溶液中疏水缔合微区的形成。采用黏度法研究了溶液中 HmCmFG 大分子与 NaCl、表面活性剂十六烷基三甲基溴化铵 (CTAB) 及十二烷基硫酸钠 (SDS) 的相互作用。结果表明, Dod 取代度小于 5.7 时, NaCl 的加入以增强 HmCmFG 分子间缔合为主, 溶液黏度增加, 加入 CTAB 对于 Dod 取代度小于 5.7 时的溶液黏度值的影响高于 SDS; Dod 取代度为 10.2 或 Cet 取代度为 6.3 时, 加入 NaCl、CTAB 或 SDS 后使 HmCmFG 分子内缔合占优势, 溶液黏度降低。

关键词

[香豆胶](#) [疏水改性](#) [聚电解质](#) [溶液性能](#)

分类号

## Solution properties of hydrophobically modified anion polyelectrolytes based on Fenugreek gum

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### Abstract

Hydrophobically modified anion polyelectrolytes based on Fenugreek gum (HmCmFG) were prepared by fixation of dodecyl (Dod) or cetyl (Cet) chains onto carboxymethyl Fenugreek gum backbone via ester functions. Fluorescence excitation and emission spectra of probe pyrene and UV spectra were used to investigate the hydrophobically associating behavior of HmCmFG in solutions. The experiment data showed that hydrophobically associating behavior was significantly affected by the length and substitution degree of alkyl chains and concentration of low molecular electrolyte NaCl, the increase of which was in favor of the formation of hydrophobic microdomains. Viscometric experiments were carried out to study the interactions between HmCmFG and NaCl, [HJ] hexadecyl trimethyl ammonium bromide (CTAB) or sodium dodecyl sulfate (SDS). The addition of NaCl mainly strengthened intermolecular hydrophobic interactions for HmCmFG with the substitution degree of dodecyl lower than 5.7, leading to increasing viscosity of solutions. The effect of CTAB on the viscosity of solutions of HmCmFG with dodecyl substitution degree lower than 5.7 was greater than that of SDS. As for Dod 10.2 and Cet 6.3, the addition of NaCl, CTAB or SDS decreased solution viscosities by strengthening intra-molecular hydrophobic aggregation.

### Key words

[Fenugreek gum](#) [hydrophobically modified](#) [polyelectrolytes](#) [solution properties](#)

### 扩展功能

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