

3rd Annual Conference and Expo on

BIOMATERIALS

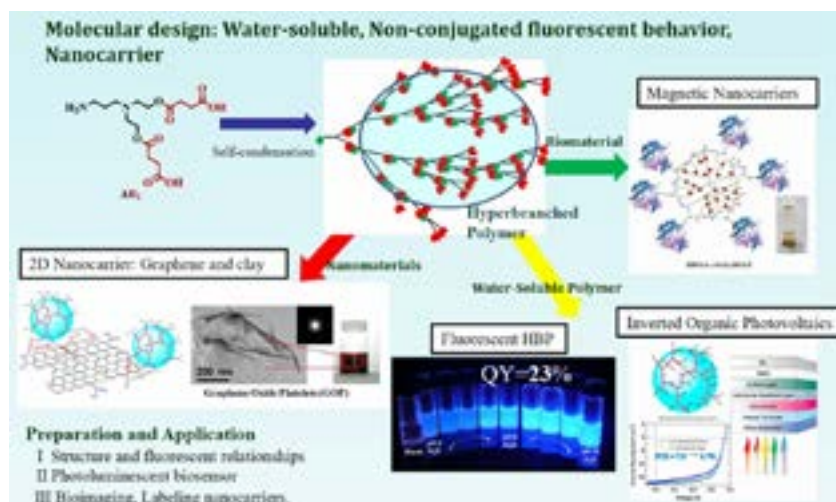
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Development of fluorescent water-soluble hyperbranched polymers in nanomaterials and biomaterials

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In this study, we intend to use self-condensation of an AB₂ monomer to prepare fluorescent hyperbranched poly (amido acids) (HBPAAs) featuring wholly aliphatic backbones, multiple terminal CO₂H units, and many internal tertiary amino and amido moieties. Because tertiary amino groups are known to behave as fluorescent centers in dendritic structures, in this study we wish to prepare AB₂ monomer through an efficient synthetic scheme, involving blocking and deblocking processes, in high yield. Visible blue photoluminescence self-emissions would be generated from the non-conjugated HBPAAs in aqueous solution; that is, bright blue fluorescence behavior, with emission peaks at 395 nm and fluorescence QYs of up to 23%, appeared when the branching tertiary amino moieties were embedded in a self-polymerized globular confinement. These amphiphilic HBPAAs also have potential for use as tracing nanocarriers and molecular-level containers. Self-condensation of this AB₂ building block to construct water-soluble globular architectures with desired fluorescence properties appears to be a facile approach toward dendritic macromolecules with labeling-delivery applications.



Recent publications

1. Lin L L, Chi M C, Lan E G, Lin M G, Juang T Y, et al. (2017) Facile immobilization of *Bacillus licheniformis* γ -glutamyltranspeptidase onto graphene oxide nanosheets and its application to the biocatalytic synthesis of γ -l-glutamyl peptides. *International Journal of Biological Macromolecules* pii: S0141-8130(17)32915-X.
2. Kan S C, Lee C C, Hsu Y C, Peng Y H, Chen C C, et al. (2017) Enhanced surfactin production via the addition of layered double hydroxides. *Journal of the Taiwan Institute of Chemical Engineers* 80:10.
3. Juang T Y, Hsu Y C, Jiang B H and Chen C P (2016) Highly efficient inverted organic photovoltaics containing aliphatic hyperbranched polymers as cathode modified layers. *Macromolecules* 49:7837.
4. Juang T Y, Kan S J, Chen Y Y, Tsai Y L, Lin M G, et al. (2014) Surface-functionalized hyperbranched poly(amido acid) magnetic nanocarriers for covalent immobilization of a bacterial γ -glutamyltranspeptidase. *Molecules* 19:4997.
5. Su Y A, Chen W F, Juang T Y, Ting W H, Liu T Y, et al. (2014) Honeycomb-like polymeric films from dendritic polymers presenting reactive pendent moieties. *Polymer* 55:1481.

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Biography

Tzong-Yuan Juang is an Assistant Professor in the Department of Cosmeceutics, China Medical University, Taiwan. His research interests are focused on developing water-soluble dendritic macromolecules including dendrimers and hyperbranched macromolecules, and studying their supramolecular chemistry in solution and the relationship and applications at organic/inorganic interfaces. Potential application areas such as molecular exfoliation for 2D layered graphene and natural clay, fluorescent carrier molecules for container and drug delivery for biomedical applications.

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