FRET between Doxorubicine and Aluminum phthalocyanine

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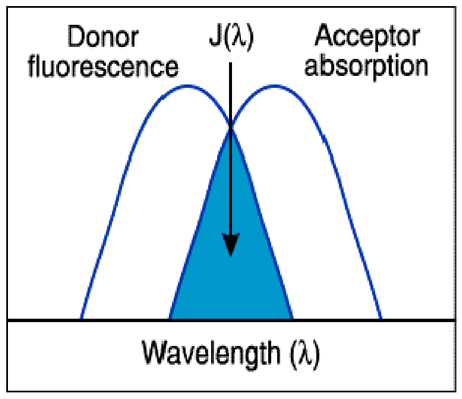
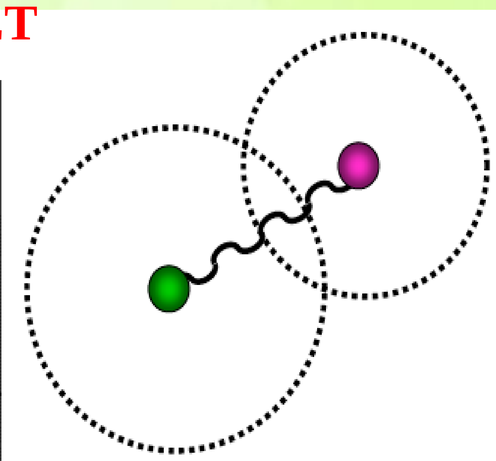
Abstract:Fluorescent resonance energy transfer (FRET) is not merely a powerful technique for studying conformational distribution and dynamics of biological molecules, but also an effectively approach to enhance the fluorescence of a substance. Aluminum phthalocyanine(AlPcS), a widely used photosensitiser for photodynamic therapy (PDT) of cancer, was conjugated to doxorubicine (Dox), a chemotherapy drug, via the electrostatic binding. AlPcS-Dox conjugation was confirmed by electrophoresis. Recently,we have proceed an effectively exploration about the FRET between AlPcS and Dox. Finally, we discovered that Dox can enhance the fluoresence of AlPcS, and vice versa.

The principle of FRET





Only the following essential conditions be guaranteed :

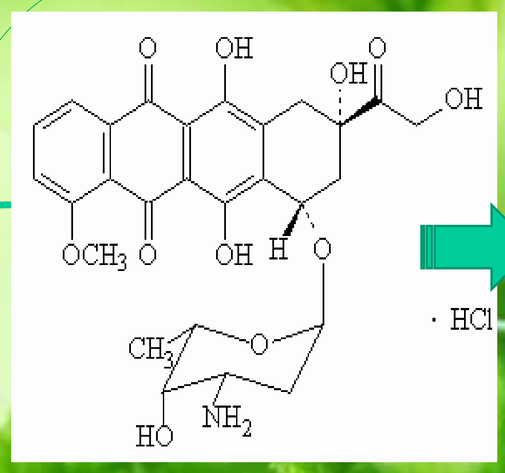
1.The molecules of the two kind of substance's distance should be within10nm;

2.The substances should be fluorescent materials;

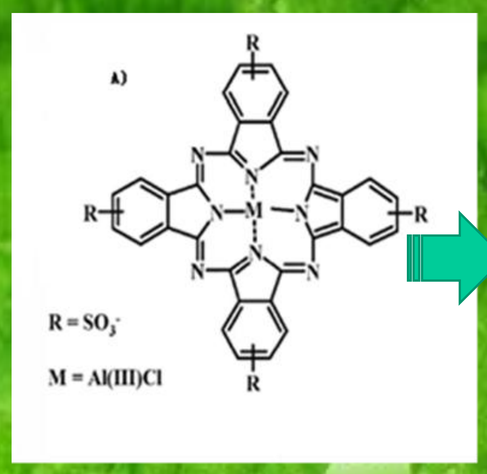
3.The donor's emission spectrum and the acceptor's absorption line markedly overlap.

Experiments

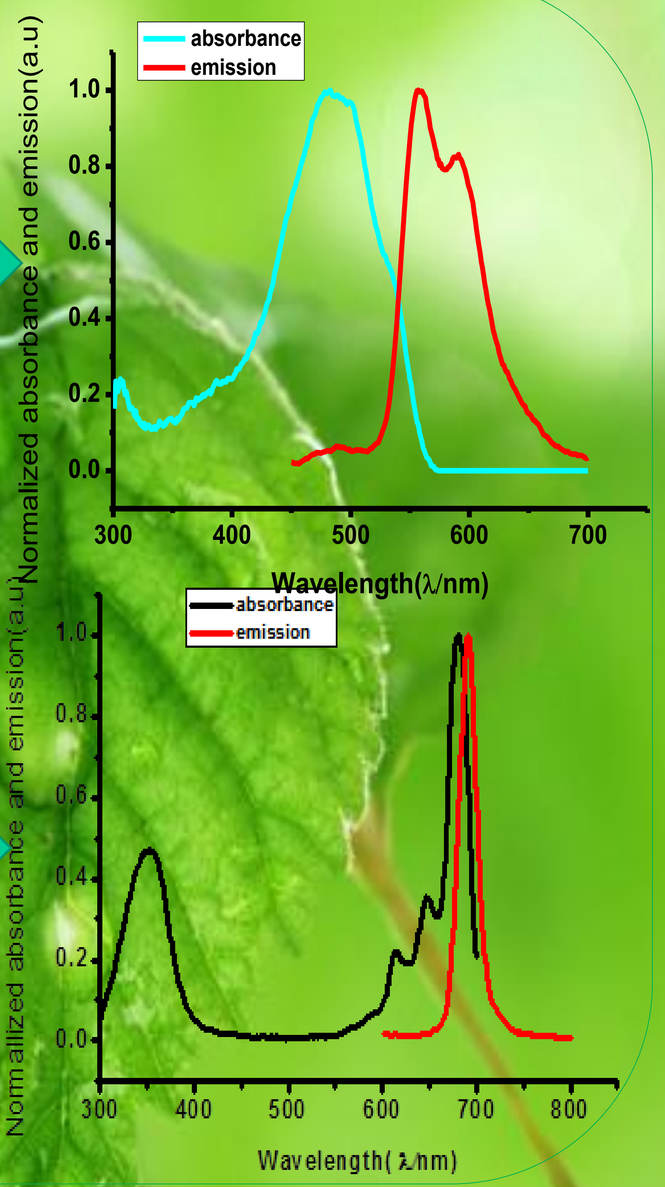
FRET ?

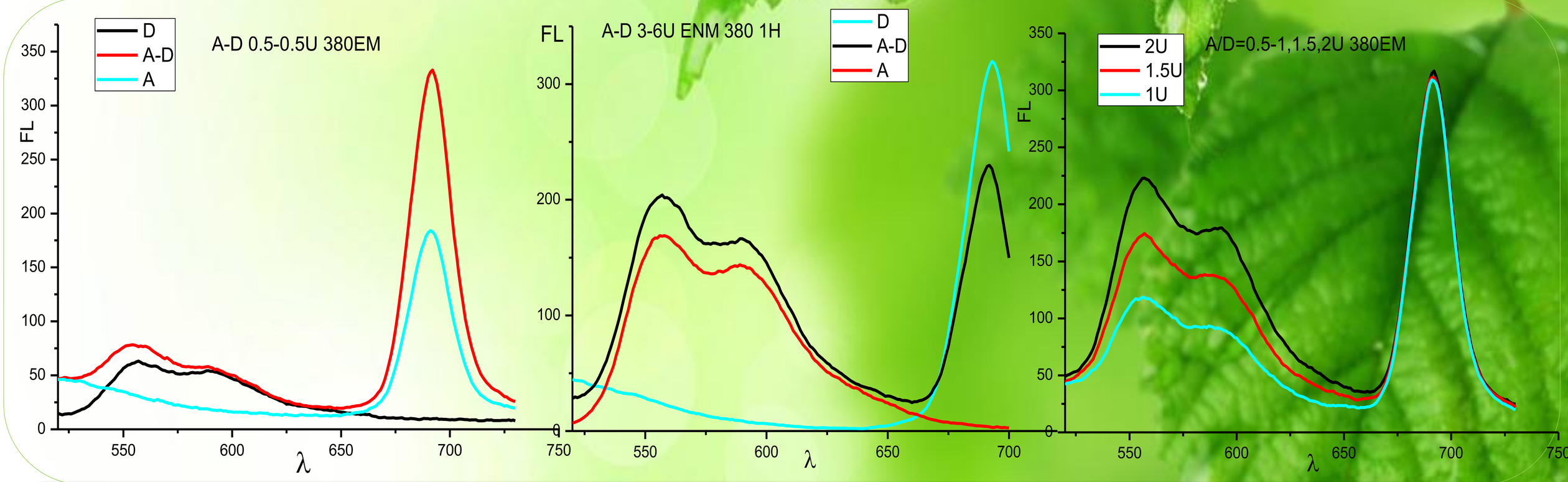


Dox(postive “+”)



AlPcS(negative “-”)





Conclusion:1.The fluorescence of AlPcS(A) has a distinct enhancement when the excite line is set at 380nm .

2. The fluorescence of Dox(D) has a distinct enhancement when the excite line is set at 480nm .

3.When the concentration ratio of AlPcS(A) and Dox(D) is 1/2 ,the Conjugation is saturated.

Future Work:There still exists lots of work to continue to explore the impact about mixing time and conjugation temperature on FRET effect.

Reference:(1) Weiss, S. (1999) Science 283, 1676–1683.

(2) Moerner, W. E., and Orrit, M. (1999) Science 283, 1670.

(3) Weiss, S. (2000) Nat. Struct. Biol. 7, 724–729.